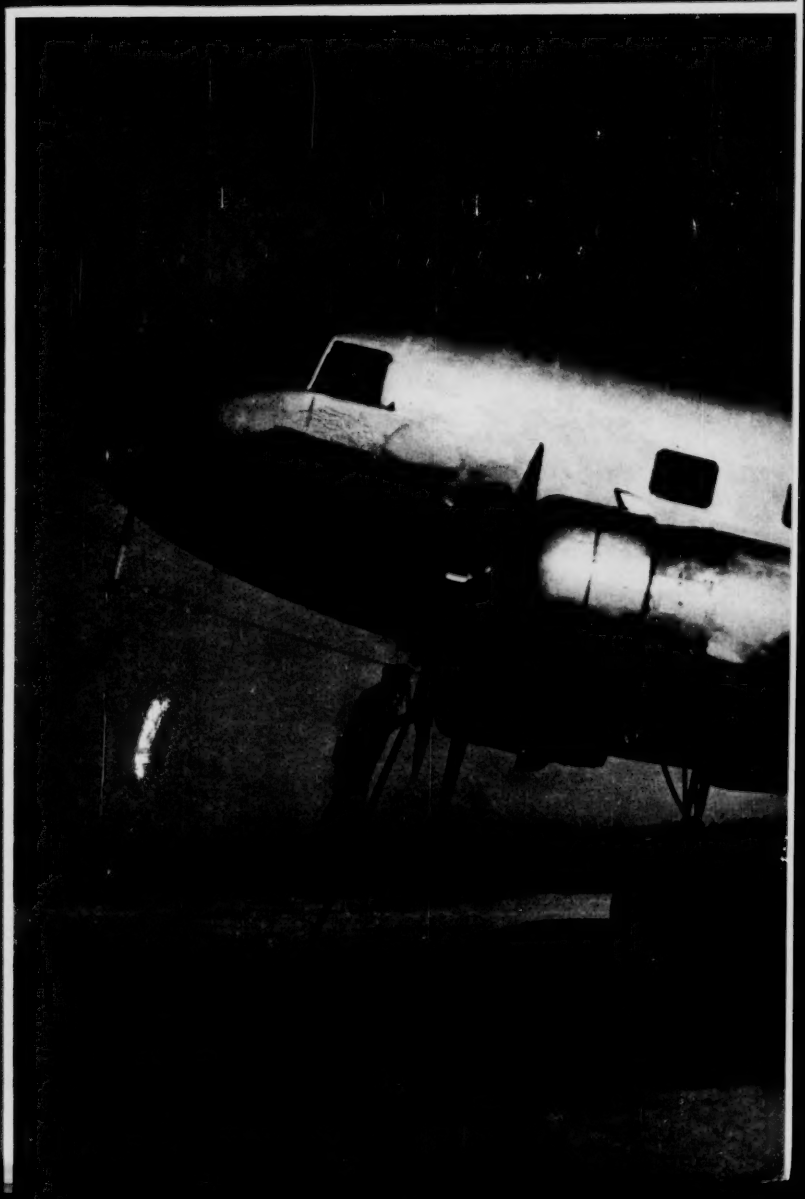
STANDARDIZATION

Formerly Industrial Standardization

News Magazine of the American Standards Association, Incorporated



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Readers Write

A Suggestion from Switzerland

Baden, Switzerland

Gentlemen: In Switzerland we have been engaged for some time in establishing material designations, especially for heavy metals. A subcommittee has been charged with clarifying the needs of producers and consumers and with finding a designation (for the time being solely for steel) that will satisfy in every respect both producers and consumers. The undersigned has presided over the subcommittee and also has taken an active part personally in developing the new system of designating working materials.

This subcommittee is a subgroup of the technical committee 13 "Steel" of the standardization section of the society of the Swiss Machinery Manufacturers, the official Swiss standardizing body of the engineering industry.

The deliberations of the subcommittee have now been successfully terminated, and the results are scheduled for early publication in Switzerland.

I was very much interested in the opinions of outstanding members of American industry as shown in the article "Should a Single Material Specification System Be Established?" in the July 1946 issue of INDUSTRIAL STANDARDIZATION. The subcommittee studied this publication with the greatest interest.

Although the problem of steel designations was tackled by the former world organization for standardization, the ISA, no system has been found that would satisfy both the producers and consumers. There have been, particularly during the last ten years, a great many discussions about the system of designations in use in your country. It seemed to me of some interest to draw your attention to the fact that the entire question of materials specification has been discussed in Switzerland also. I therefore take the liberty of placing at your disposal a summary of our deliberations and the specifications arrived at. It is certainly of utmost interest when speaking of materials to use a language that may be understood in all countries, because only too often we have found that the designations used in your country are based to a great extent on specifications that are not well known in Europe. If it should become possible to introduce designations based on international specification a mutual understanding would be greatly facilitated.

The subcommittee, and I myself, believe that with the system described in this article a step in the right direction

Company Members

More than 2100 companies hold membership either directly or by group arrangement through their respective trade associations

Readers Write

Continued

has been made in the international designation of materials, especially since it may be used not only for metallic materials but also for others.

We would be particularly interested in your opinion or that of others concerned with the problem.

H. ABEGG,
Society of Swiss
Machinery Manufacturers

. . Mr Abegg's article is presented on page 172.

Information Wanted On Decimal Dimensioning

Westfield Trade School
Westfield, Massachusetts

Gentlemen: Will you kindly send me the latest American Standards Association publication on decimal dimensioning?

GEORGE B. LUDWIG, Instructor
Drafting Department

• • No publication dealing with decimal dimensioning exclusively is available from ASA. Two sections, five and six, of the American Standard Drawings and Drafting Room Practice, Z14.1-1946, deal with dimensioning and include recommendations on decimal dimensioning. However, The Society of Automotive Engineers has a manual on aeronautical standards dealing exclusively with decimal dimensioning. Requests should be addressed to James Reading, Society of Automotive Engineers, 21 West 39th Street, New York City.

Opinions expressed by authors in STANDARDIZATION *are not necessarily those of the American Standards Association.*

Our Front Cover

An airplane is thoroughly checked and inspected before it is allowed to leave the ground. Photo—Charles Phelps Cushing.

Vol. 20 No. 7 Standardization July 1949

Published Monthly by AMERICAN STANDARDS ASSOCIATION INCORPORATED 70 E. 45th St., N. Y. 17

In This Issue

Special Features—

It's Model Railroading
By W. F. McAllister 169
A Suggestion from Switzerland—What About Steel Designations?
By H. Abegg 172
Airlines Can Profit by Standardization
By K. Derdiarian 175

For Company Members—

Company Member Conference Considers Problems of the Day 181
What B1.1-1949 Means to Industry
By Frank P. Tisch 188
List of American Standards Is Now Available 192
What's Happening on Projects 193

For Materials Handling—

For Modern Materials Handling—Pallets 179
Australia Works on the Standard Pallet 180

In the Electrical Field—

USNC Elects New Officers 181
Case History of the Standards on Electric Discharge Lamps
By George L. Diggles 182
ASESA—What It Is and Does
By Colonel Louis J. Tatom 185

For Safety—

Color for Industrial Safety 176

In the Building Field—

Coodinating Committee Organized for Plumbing 192

Of International Interest—

Japan Revives Its Standards Program 190
Standards From Other Countries 191
Pan American Engineering Congress to Meet in Rio de Janeiro 194

Obituary

Preston S. Millar 180

Book Reviews 183

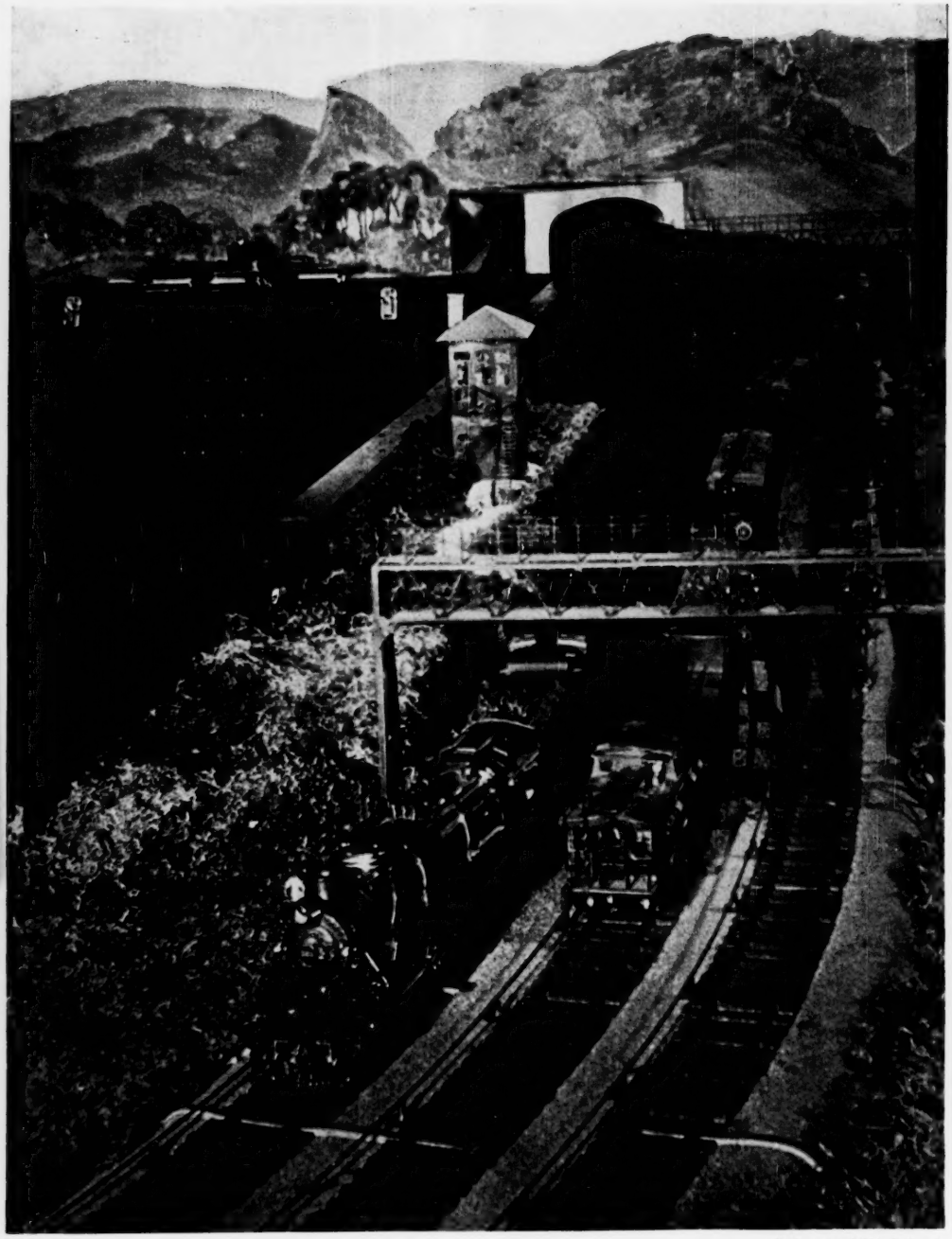
ASA Standards Activities—Status as of June 3 193

ASA
Reg. U. S. Pat. Off.

Ruth E. Mason, Editor Barbara A. Lamson, Production Editor
Advertising Representatives—Woolf & Elofson, 70 E. 45th St., New York 17, N.Y.

Standardization is dynamic, not static. It means not to stand still, but to move forward together.

Single copy, 35c. $4.00 per year (foreign $5.00). Schools and libraries $3.00 (foreign $4.00). Re-entered as second class matter January 11, 1949, at the post office at New York, N. Y., under the Act of March 3, 1879. Indexed in the Engineering Index and the Industrial Arts Index.



Baltimore and Ohio Railroad

Casey Jones never rode this line — it's a model railroad. Shiny buttons, left, are part of control panel.

It's a lot of fun

It's a hobby, with a national organization

It's equipped with standards—yes, it has standards for types and dimensions

It's Model Railroading

By W. F. McAllister

THE art of model railroading goes way back—probably as far as real railroading. In early days models of railroad equipment were used primarily as decorative pieces—what we now call mantelpiece models. Later, some adventurous individual cast crude iron replicas of locomotives and cars, with wheels that would turn—sometimes, which could be pulled along the floor with a string. European genius and American mechanical skill added clockwork motors, track loops, and mechanical controls, and in the early part of the century the electric motor. At that point this child's toy just had to be put together by father.

It was soon found that the various standard toy train sets manufactured by Lionel, American Flyer, and others would not work well together, for several reasons:

1. Cars of various manufacturers would not couple together.
2. Track of various manufacturers would not fit together because of different pin and slot dimensions, as well as radius of curves.
3. Cars were of different lengths, widths, and weights and would not stay on the tracks at the speeds for which the engines were designed (300 to 400 scale miles per hour).

Nevertheless, a toy had been found at last which inspired creative efforts. By dint of ingenuity, skill, patience, and invention, an enthusiast found that he could make, in his own cellar or attic, a rather realistic portion of a real railroad. His layout was generally replete with hillsides, houses, railways, people—and secrecy, for only *children* "played with trains." Occasionally, a few friends were invited in to see his handiwork. The results of these inspections were not always happy. Friends would point out that the tracks were too far apart, the speeds too high, and that the trains did not look like their prototypes.

So the scenery and track were neglected, and with more time and more skilled work, models of cars were built almost to scale and mounted on the toy trucks that were removed from the old cars. Pins and staples were used for couplers, however, the cars had to be spaced too far apart (six or seven scale feet) so that the corners would not hit when the train went around curves. Our pioneering enthusiast tried to make larger radius curves to solve this problem but found the tinplate track too hard to handle. In desperation, he turned to barrel hoops, strap iron, and innumerable other metals in his attempt to make his own track. In many cases he was very successful. But when a friend would bring in what he considered a properly scaled "real" model to run on the track, unhappily it usually would not fit. Even the couplers would not fit. This was most annoying to both hobbyists.

As techniques improved and the art of model railroading became more widespread, several daring men proclaimed the formation of clubs, whose object was to play trains. The competition that resulted from the desire to surpass each other drove members to one excess after another in the types of rolling stock and equipment used. There were difficulties and many wars between the tracklayers and the rolling stock builders as to which, the track or the car, had the proper scale reduction. Several members of the early clubs made patterns for equipment and began to sell a few castings to other members, and later to anyone who would buy. Some of these parts would fit together and others would not.

During the depression enthusiasts, having more time to "fool around" with the hobby, decided that there should be a set of standard dimensions to which all members must adhere. From this idea grew the National Model Railroad Association, which was to try to standardize all critical dimensions for all models and approve the products of the manufacturers who met those standards.

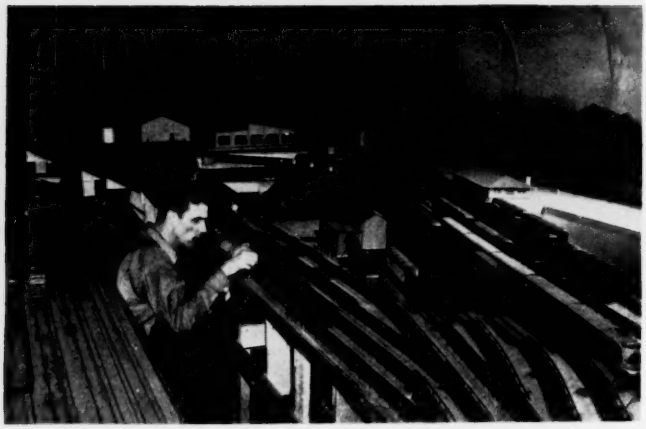
These rumblings of standardization

The Author at the Controls

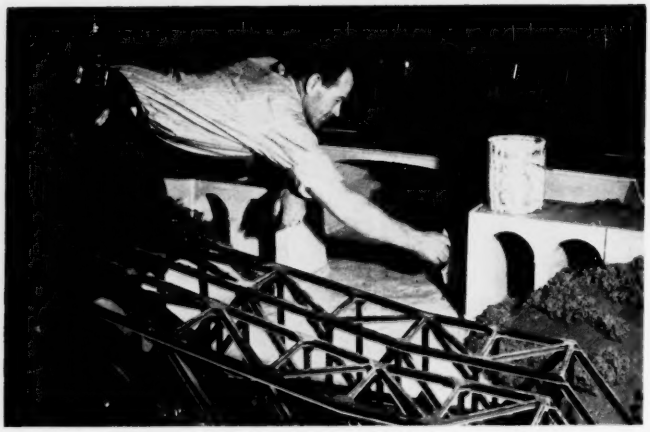
Mr McAllister, shown here concentrating on the control panel in the New York Society of Model Engineers' clubhouse, is a professional engineer in Cincinnati. Past chairman of NMRA's Engineering Committee, he is an enthusiastic model railroader.

Present chairman of the Engineering Committee is M. J. J. Harrison, who contributed additional material to incorporate into this article. Mr Harrison is an engineer—though not an engineman—with the Pennsylvania Railroad.

NOTE: Lionel, American Flyer, and Ives were the first great exponents. Today Lionel and American Flyer are the two largest manufacturers of model trains in the United States, Ives having been absorbed by Lionel in the meantime.



Complete absorption in a piece of track is shown by one hobbyist . . .



N. Y. Society of Model Engineers, Inc.

. . . While another cheerfully paints a river under the railroad overpass.

were beginning to be heard in 1934-35; the NMRA was started in Milwaukee in 1935-36. Publicity was given the NMRA and its aims in what was then a small journal, called the *Model Railroader*. (This magazine now has a circulation of over 30,000 a month.) At that time its circulation was only 1,500, but these 1,500 were fanatics and willing to travel great distances to further their hobby. Conventions were held in Milwaukee, Cincinnati, New York, Buffalo, and elsewhere. Finally, by a series of ballots of the paid members, various dimensions were established.

The standard dimensions are based on several recognized scales (the ratio between the linear dimensions of the models and their prototypes). Thus any model is an accurate model, no matter to what scale it is constructed, if all of its dimensions are reduced from the prototype in the same ratio. There are four different "standard" scales for the electrically operated models. Listed in the chronological order in which they became popular they are:

O-gage	ratio 1:48
OO-gage	1:76.2
HO-gage	1:87.1
S-gage	1:64

The NMRA may rightfully claim credit for confining the number of these "standard" ratios or scales to a minimum. At the present time, formal acceptance of a fifth "standard" scale is under consideration, to be known, probably, as either "TT" or "T", with a ratio of 1:120.

Odd Gage Ratios Derived From Metric System

The odd figures shown above as the accepted ratios for "OO" and "HO" are due to the fact that they were originally developed as metric ratios (respectively, 4 mm equals 1 ft, and 3.5 mm equals 1 ft). Because expensive confusion resulted from the attempt to use metric gages, the standard dimensions derived from these ratios are now expressed in decimals of the inch. Tolerances in these, as well as other scales, are expressed in decimals (usually thousandths) of an inch.

The principal dimensions established in these various gages or ratios were: Inside dimensions of running rails; back-to-back dimensions between wheels; size of flanges; size of tread or tire; coupler height above rails; location of third rails; spacing of third rail shoes.

The fact that small electric motors are practically always used, and clockwork driving mechanisms are virtually unknown, in American-made "scale" models at the present time, has led to standardization on voltage, with resulting manufacturing economies. The Standard for direct current is 12 volts; for alternating current, 16 volts.

The one exception to the use of electric motors is the so-called live-steam model. In this type of construction, the locomotive is actually a miniature steam locomotive, generating its own steam in its own boiler and using alcohol or other fuel. These models are (at least within practical limits) to exact scale —as small in some cases as 1:48, but usually 1:24 or 1:16. They are of relatively little interest from a standards viewpoint, except for wheel dimensions, however, since there are probably not over 2,000 in the entire United States.

At First Manufacturers Were Reluctant

Great difficulty was experienced in inducing the manufacturers of model supplies to pay attention to the standard dimensions. The manufacturers of toy railroads ignored them completely for some time. As a result of this indifference, the NMRA offered a seal of compliance to those who would accept their standards. Some accepted, and it became known that

the buyer had a much better chance of getting equipment which would work with his layout if it had an NMRA seal. Most of the nonconforming manufacturers are now out of business, while many of those who complied are doing all right. NMRA does not claim this success as due to its efforts alone. General business conditions and the war also played a part.

Retooling Was By NMRA Standards

During the later years of the war, some NMRA members decided that this was the ideal time to establish a set of new standards. On the assumption that retooling would be necessary after the war, that the jigs and fixtures would be new, and that they could as well be made to NMRA dimensions as any others, a restudy of the hobby undertaken. Meetings were held, committees appointed, studies made, and entirely revised standards submitted for approval. In addition some recommendations were made on the basis that various factors were desirable practice, of importance but not yet requiring standardization. The standards were accepted by letter ballot vote of the members.

To enforce the adopted standards, an Inspection Committee was established, also by letter ballot. The members of this committee purchase various items in the open market, which they then subject to analysis for conformance with the standards. Periodic reports are published in the *NMRA Bulletin* in which the maker is praised or criticized in detail.

Several committees have been appointed to investigate the technical phases of model railroading. In addition, there is an Engineering Committee which correlates the recommendations of the several Standards Committees. This insures that no recommendation will be offered for adoption by one Standards Committee without considering the effect of that recommendation on the work of other Standards Committees. The members of the Engineering Committee are the chairmen of the several Standards Committees with the chairmen of certain other technical committees.

In more detail, the engineering committee has done an enormous amount of work in establishing a standardized nomenclature, based on practices approved by industry, the Association of American Railroads, and the American Standards Association. It has completed a report on a standardized track circuit—to detect the presence of a train—suitable for the need. The turnout committee (a turnout is what a layman calls a switch) has finished and is about to report on a set of standard turnouts and crossovers, complete with all necessary dimensions for either home or factory assembly. These and other reports will be discussed at the next convention in Denver. Meanwhile study continues. Data sheets have been issued on a mass of information applicable to the hobby, from nut and bolt dimensions to track curvature calculations.

Model railroaders are not selected for important assignments in the National Model Railroad Association because of any connection with railroading or with a technical organization or profession. A practicing physician, an architect, and an artist are chairmen of NMRA standards committees and members of the important Engineering Committee. Other committees are chairmaned by a commercial printer, a purchasing agent, a retired factory manager, an electronic engineer, in addition to two bona fide technical employees of regular railroads. Members of the Engineering Committee are:

O-gage, steam-type standards	W. A. Gohring, Queens Village, N. Y.
O-gage, interurban and trolley	A. V. Johansson, Erie, Pa.
HO-gage, steam-type standards	M. R. Friedberg, Cleveland Heights, Ohio
HO-gage, interurban and trolley	S. O. Chausse, Toledo, Ohio
OO-gage standards	J. F. Trout, Los Angeles, Calif.
S-gage standards	C. H. Johnson, St. Louis, Mo.
Narrow-gage standards	J. M. Alexander, Bradford, Pa.
Live-steam standards	W. I. Brown and V. T. Shattock, Oakland, Calif.
Trackwork	Allen Hazen, West Buxton, Maine
Couplers	L. M. Greasel, Ashland, Ky.
Electrical Circuits	R. H. Huebenthal, Scotia, N. Y.
Electrical Devices	R. A. Beveridge, Minneapolis, Minn.

Chairman of the Engineering Committee is M. J. J. Harrison, Altoona, Pa.

A permanent office is maintained by the Association at Wichita, Kansas. Supplementing one national annual meeting, a plan of regional meetings is in effect which permits interested hobbyists to meet at minimum cost in travel time and expense. In addition, a large number of clubs have been formed, giving hobbyists who have no space in their homes for adequate track an opportunity to display and operate their home-built rolling stock.

Membership in the Association is open to all who are interested in the hobby. This year's officers are:

President	W. E. Hare, Huntingdon Valley, Pa.
Vice-President	E. E. Ruhland, Milwaukee, Wis.
Secretary	C. F. Coleman, Knoxville, Tenn.
Treasurer	E. A. Ravenscroft, Glencoe, Ill.

Now Manufacturers Cooperate

Since the war, manufacturers have been cooperative in utilizing NMRA standards, especially where interchangeability is a factor. Many of the recommended practices have also been incorporated into their designs. Through their own association, manufacturers are represented on the NMRA basic standards committee in an advisory capacity. Although they have no vote, careful consideration is given to their side of the story.

Present membership of the NMRA is about 10,000. As far as is known, all manufacturers of model railroad equipment are represented by either corporate or individual memberships.

When progress in the field during the past 15 years is reviewed, it is evident that many steps forward have been taken. From the standards viewpoint, the greatest failure has been with the tinplate manufacturers who refuse to be impressed by the advantages of interchangeable track, couplers, cars, and equipment, although some advances have been made. In fact, products manufactured within a given company are frequently altered so that they are not interchangeable with the products previously manufactured by the same company.

Considering the over-all picture, many important standards have been adopted. Even more standardization is looked forward to soon.

A Suggestion from Switzerland—

What About Steel Designations?

Swiss engineers ask U. S. comment on proposed system of steel designations; urge international agreement to ease procurement difficulties

By H. Abegg

DIFFICULTIES encountered during the war in procurement of materials have shown how necessary it is that the same specifications for materials be used all over the world. The comparison of steels from different countries, for example, involves a tremendous amount of work, and the difficulties of comparison are increased by the fact that in some countries various technical committees have issued different standards and designations for materials. This practice makes it impossible to determine which is the most usual and well known specification in any particular country, since these committees often distinguish between materials used for different purposes, for instance, for aircraft, power-driven vehicles, naval vessels, or for other uses, and the same material is found in different specifications.

The reason often given for this procedure is that for different applications the material has to be stressed and treated differently. Naturally the same material given different metallurgical treatment (heat treatment, rolling, drawing), will have different properties and this may justify a changed or new designation.

Requirements of a Materials Specification

In the first place a materials specification should contain the objective range of application and then the properties of the material. This is in view of the fact that the greater number of individuals and companies who deal with steel are users. The producer would prefer to designate by means of analysis, while the user is in favor of brief application data.

How to give due consideration to both these requirements is the main problem of the entire materials specifications question, particularly when the solution should be internationally acceptable. To date, the known specification systems have been only partially satisfactory. Both in Europe and America protests have been made against the present state of affairs and there has been no lack of discussion or proposals for solution.*

An investigation of the question of materials specifications reveals the following:

1. The manufacturer is interested in a designation which indicates an analysis of the alloy by name and weight proportions. It is to be noted, however, that the producer cannot divulge small differences in the alloy which are manufacturing secrets, and therefore the designation cannot be entirely complete.
2. The designer attaches great importance to a designation which is as short as possible so that it can be entered in parts lists, and which gives particulars of only the most important properties of the material. Small alloying additions, or other particulars of this kind are of less interest than the predominant alloying elements which indicate whether the steel is stainless, capable of being hardened, tough, or brittle. Many designers are incapable of distinguishing between small differences in the composition and have to apply to the metallurgist. This is quite understandable, because the main consideration of the designer is that his machine or apparatus should function. Small users, such as locksmiths, blacksmiths, mechanics, and plumbers, generally buy steel according to its strength. They have no knowledge of other particulars.
3. Repairmen, either at home or abroad, often have to replace part of a machine and must therefore use the same material as that used in the machine originally. In this case they will be guided by the use to which the material is to be put, because they do not know its composition, unless detailed drawings happen to be available.

* For example, see INDUSTRIAL STANDARDIZATION, July 1946, p. 172.

Mr Abegg, of Baden, Switzerland, is chairman of a subcommittee of Technical Committee 13 on Steel of the Society of the Swiss Machinery Manufacturers. This subcommittee was charged with preparation of a standard system of material designations, and as described by Mr Abegg in this article has now come up with a suggestion for steel designations which will soon be considered by the Swiss standards association. Knowing that the question of standard material designations has received considerable attention in this country (the subcommittee studied with interest the Symposium reprinted from *Machine Design* in the July 1946 issue of INDUSTRIAL STANDARDIZATION), Mr Abegg has made available this description of the proposed Swiss system for discussion. (See Mr Abegg's letter in "Readers Write.")

Because this question is a controversial one in the United States, the three organizations most closely concerned (the American Iron and Steel Institute, the Society of Automotive Engineers, and the American Society for Testing Materials) are being asked for comments. A subcommittee of the Company Member Conference which has had this question under consideration from the viewpoint of the companies using the specifications is also being asked to comment. The comments received will be published in a forthcoming issue.

Codes consisting of designations or explanatory symbols fundamentally contain sources of error. On the other hand, a code consisting entirely of numbers, for instance a number with six or seven digits, may not necessarily convey the same meaning to all concerned with the production or use of the material. A designation containing abbreviations referring to the properties of the material, mixed with numbers characterizing the values of the material (e.g., strength, watt loss, etc) is good from the mnemotechnical point of view.

From the above-mentioned three points it may be concluded that a materials specification must first of all have a certain base which should contain in as brief form as possible the essential data about the material. Further particulars could then of course be added to this base which would be of special assistance to the manufacturer and even to the user under certain circumstances.

Only Minimum Requirements Should Be Specified

Standard specifications should always be of a broad kind and should only satisfy minimum requirements. It should always be possible to augment them, however.

Standard designations should be easy to pronounce. When the care that is devoted to the designation of articles for advertising purposes is considered, it is evident that a certain importance should also be attached to this aspect of materials specifications, particularly if they are to be accepted internationally.

Generally, the first requirement of a materials specification is that it should indicate the form. Then should follow a short term such as St, Cu, Br, indicating the material, and the characteristic number for such a property as, for example, the tensile strength. Such a specification is often sufficient for a rough definition of the material (see Table 1).

Most manufacturers designate their steels by analysis, as already stated, however. If the basic specification given in the above table were combined with the analysis, a fairly accurate specification for a steel could be obtained (see Table 2).

Other properties, such as values for elongation, yield point, Brinell hardness number, or particulars about resistance to scaling, for example, can be obtained from the detail standard sheet for the steel in question.

This method of designation can be subject to criticism, of course:—

Table 1. Designations That Might Be Used in Arriving at a Minimum Basic Code Designation

Form	*Material*	*Use*	*Tensile strength*	*Minimum Code Designation*
Round ϕ	Steel St	Mechanical Engineering MB*	50 kg/mm² 50	ϕ St MB* 50
Profile T	Steel St	Civil Engineering CB*	35 kg/mm² 35	T St CB* 35

*The abbreviations are taken from the German language.

Table 2. How the Minimum Code Designation Can be Combined With the Analysis of the Material for a More Accurate Code Designation

Form	*Minimum basic specification*			*Specification for more accurate definition*	*Code Designation*
	Material	*Use*	*Tensile strength kg/mm²*	*Analysis*	
ϕ	St	Tempering V*	45	C 30 Mn 75	ϕ St V* 45C30Mn75
U	St	Case hardening E*	80	C 15 Ni 35	U St E* 80C15Ni35

*The abbreviations are taken from the German language.

When a steel is designated by other properties (forged, rolled, drawn, weldable, hardenable), it can be objected that such a system can only be understood in one language because the abbreviations are taken from this language.

This objection is certainly correct and has to be taken into account. Difficulties of language and its abbreviations are always present. As a solution, any attempt to employ abbreviations from Latin or Greek would fail because these old languages do not contain the necessary expressions. A comparison of the most commonly used expressions in the modern languages might be more successful. However, a detailed study of the whole matter inevitably leads to the conclusion that an international word designation cannot be understood everywhere.

Swiss Specification System Uses Numbers

As a result, it has been proposed in Switzerland to revert to a specification expressed in numbers. This would make it necessary to evolve a definite number scheme.

As already stated, this proposed system fundamentally contains sources of error but does possess the advantage that when translated into the most widely differing languages it can be understood. The proposal does not contemplate that a steel specification in the domain of any one language should consist only of numbers, but that the system of numbers should be for international use.

The same suggestion could also be made for the use of colors, but in that case the designations for colors would have to be expressed in words, since colors are not shown on a typewriter.

Standards Committee to Make Any New Designations

There's a certain danger in the use of the number designations, however, because cases are certain to occur where a firm will want to create a new number designation for a new type of steel. This is inadmissible, of course. To obviate this difficulty in Switzerland, a Standards Committee has been appointed to compile an index of any new steels which may have to be standardized and to designate steels officially by means of abbreviations in letters and with numbers.

The principle of this proposed materials specification system is based on covering, at least approximately, the following points:

1. The material as such: e.g., steel, copper, brass

Table 3. The Proposed Standard System of Steel Specifications Designations

Section	*Specification*	*Designating letters or numbers*
1 — Material	Steel	St
2 — Requirements	Use	
mechanical	general civil engineering	CB or 01
	general mechanical engineering	MB 02
	case hardening	EN 04
	tempering	VG 05
	nitriding	NI 06
	temperature resistance	TB 08
	automatic lathes	AU 10
	deep drawing	TZ 11
	screwing	SC 15
	riveting	NT 16
chemical	rust resistance	SR 31
	stainless	NR 32
	resistance to alkalies	LB 34
	resistance to acids	SB 35
	resistance to scaling	ZB 37
physical	small heat expansion	KW 41
3 — How formed	forged	s or 1
	rolled	w 2
	drawn	z 3
	sintered (powder)	p 4
4 — Heat treatment	none	k or 0
	spheroidized	g 1
	normalized	n 2
	tempered	v 3
	hardened	h 4
5 — Characteristic values	tensile strength	number of kg/mm² for particular tensile strength in each case
6 — Alloy group	not alloyed, purity not guaranteed	00 — 09
	not alloyed, purity guaranteed	10 — 19
	alloyed	20 — 99
7 — Analysis number	for all standardized steels by application group. Complete analysis numbers supplied by the Standardizing Office of the Swiss Society of Machinery Manufacturers	00 — 99
8 — Welding Requirements	weldable	s or 1

How to use this system for steel specification

From the eight sections of the chart, numbers or letters are taken to build up a designation for a particular type steel for a particular use. For example—a rolled steel to be used for tempering (mechanical requirements), with no heat treatment in supplied state, a tensile strength of at least 80 kg/mm², of alloy group 22 and analysis number 09, and weldable:

Specification	*Section*	*Designating letters or numbers*
Steel	1 — Material	St
Mechanical requirements, to be used for tempering	2 — Requirements and use	Vg or 05
Rolled	3 — How formed	w 2
No heat treatment in supplied state	4 — Heat treatment	k 0
Tensile strength minimum 80 kg/mm²	5 — Characteristic values	80
Alloy group 22 (NiCr)	6 — Alloy group	* 22
Analysis No 09	7 — Analysis number	* 09
Weldable	8 — Welding requirements	s 1

By putting these individual designations together, a designation for the entire materials specification is formed as: St Vg w k 80 22 09 s or

St 05 2 0 80 22 09 1

*Groups 6 and 7 may be combined and the alloy and analysis given in a combined form, according to decreasing percentage contents, whereby for steels the carbon content is stated first multiplied by 100, then the remaining elements with the percentage multiplied by 10. (See Table 2)

2. Use; e.g., for steel: civil engineering in general; mechanical engineering in general; automatic lathes; tools; hard metals
3. Condition, i.e.
   (*a*) How shaped; e.g., forged, rolled
   (*b*) Thermal treatment; e.g., none, tempered, annealed, hardened
4. Characteristic numbers; e.g., minimum tensile strength in kg per sq mm for mechanical requirements, or watt loss per kg for dynamo laminations
5. Analysis. The symbols used in the analysis cover the
   (*a*) Alloy group
   (*b*) Analysis number
   In presenting data on the analysis, the carbon content, multiplied by 100, is stated first and the contents, multiplied by 10, of the remaining elements are set down next.
6. Weldability

Other conditions or additional definitions do not belong to the specification. According to requirements, or when it is considered necessary, they can be included in writing in the order or on the piece list of the drawing (remarks column).

A so-called "verbal" system of materials specifications (using word abbreviations as compared with a "neutral" system comprising numbers only) is intended for use in the domain of any single language.

System Can Be Readily Augmented

The great advantage of this designation system is that it can readily be augmented. Voluntary discipline is essential, however, to ensure that neither user nor manufacturer makes designations of his own. There are sure to be firms which will never make use of the complete specification but will be satisfied with the so-called basic designation alone. This is no error, but is a simplification which is permissible. On the other hand, it is possible for a purchaser to use the complete specification and thus prescribe exactly, by means of the official designation, what material the manufacturer should supply.

This system should satisfy all requirements of industry and trade. In some cases firms have already created their own materials specification systems, similar to this but not so detailed. The system described here is not only suitable for augmenting such specifications, but also for use in simplifying or even replacing other systems.

The official Swiss Standards Association will decide in the near future whether this system should be definitely accepted in its proposed form.

By standardizing expendable and perishable items, which comprise 80 percent of stock on hand in many far-flung fields ——

Airlines Can Profit

By K. Derdiarian

ALMOST all the major airlines today are faced with the problem of operating aircraft manufactured by three to six different companies. Each of these manufacturers, in turn, subcontracts parts or uses equipment produced by a multitude of companies. Since every last one of these companies has its own materials, processes, specifications, and design standards, the operator is faced with an extremely difficult materials problem.

All this equipment requires special tools, lubricants, sealants, and parts. You can see the problems mounting in Stores, Purchasing, Engineering, and Supply. For example, take a simple case of a type of screw head. This may not seem to be much of a problem, but with two to three recess-type heads in addition to slotted head screws located in all parts of the aircraft, and with each type head requiring from two to three screw drivers or power-driven bits in different sizes, all multiplied by the number of bases to be supplied, the tool problem alone assumes serious proportions. It requires these tools and screws to be supplied, stored, and maintained at all points on the airline's far-flung network.

Many Perishable Items Must Be Stocked

This is only one small item in many such instances. There are a great many perishable items, such as sealants, which also must be maintained. For instance, there may be at least a dozen fuel tank sealants and their accelerators which have a maximum storage life of six to twelve months. There are many items of which stock must be maintained, although usage rates may be extremely low. Multiply these situations with every piece of equipment and you have a fair idea of the problem.

What can the operator do? He cannot ground aircraft and go through a costly process of replacing materials and parts; therefore, the process will necessarily have to be confined to replacement and overhaul which will take time. Standardization of materials and parts is the only logical solution and yet it is usually undertaken inadequately or reluctantly, with perfectly understandable reasons.

Program Will Be Difficult and Lengthy

The very nature of a standards program of this type makes it extremely difficult. Standardization will of necessity have to be lengthy, especially if no previous attempt at standardization has been made. Since it must be lengthy, new processes, materials, and equipment will always have to be dealt with. If a Standards Manual and Standards are already established it requires comparatively little effort to revise them, but with new material and equipment continuously being added, the burden on the initial standards effort is increased. Once the time element involved is accepted, however, the scope of the program can be broken down into priority classifications.

Aside from the actual mechanics of conducting a standards program and building up a Standards Manual, the major problem involved is its justification or pre-evaluation. This necessitates the forming of a committee consisting of at least three representatives, one each from Engineering, Stores, and Purchasing. This committee faces the problem of pre-evaluation. This is a very difficult task, since even final evaluation in itself is usually hazy and does not present the true picture of the value of standardization.

The stock to be standardized consists in most instances of capital assets, repairable components, and expendables. The most fertile field for standardization and the one which will have the greatest far-reaching effects is in the expendable item; i.e., hardware, raw stock, adhesives, etc. Although the expendables comprise approximately 33 percent in dollar value of the stock, they are 80 percent of the stock on hand. They require the greatest number of requisitions and purchases, as their usage rates are relatively high. The repairable components and capital assets such as spare wing units, power eggs, and equipment which will be overhauled, in most cases cannot be standardized since they are interchangeable only in very limited numbers on various types of aircraft. These items comprise approximately 67 percent of the dollar value of the stock, but it would require a great deal of development and research work to standardize this type equipment. Where obvious interchangeability exists, such as in some instruments, electrical equipment, and small pumps, standardization can be achieved without much difficulty but the percentage of standardization is small.

The next step is actually to choose a few items such as lubricants, bolts, and nuts, and then to carry through a standardization plan. This will entail exhaustive investigation of the item from a technical and dollar-wise standpoint. This step should be done bearing in mind the problem of showing justification for establishing a permanent standards group and an extensive standardization program. As previously mentioned, standardization has frequently been found to be inadequately justified or has been approved reluctantly, by which is meant that it has not been proved in dollars

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and cents, and a conclusive program has not been presented to management. By carrying out a preliminary standardization and evaluation of a few items, it can be reasonably determined beforehand what the final evaluation and tentative procedures and needs of a standards organization will be. The items chosen for this preliminary investigation should be carefully selected so as to present the average results in order to obtain a fairer picture of the program.

Once the class of items for the preliminary standardization has been decided upon, the various members of the committee should decide on a procedure to follow. Purchasing should supply data concerning dollar purchase value, catalog listings, and other pertinent data. Stores should supply usage rates, stock status data, and any other pertinent information that is available. It will be Engineering's responsibility to provide all technical information available, contact Shop foreman and personnel, perform comparison and material tests, and finally, decide upon a standard status. When all information is correlated, one can obtain, by summing up the number of items standardized, obsoleted, and salvaged, a dollar value for the group of items standardized and obsoleted. A value for shelf space and requisitioning costs can also be estimated to give a fair indication of the value of the projected program.

How Much Can Be Saved?

A great deal of valuable experience and information can be gained from the preliminary investigation and evaluation. It can now be determined in round figures what the amount of money will be that the company can save by standardization. A rough procedure has now been established which will aid in carrying out the entire project. A time estimate of the project can be made and by estimating the time, one can get an idea of the size group required to do the job. The size of the group can be adjusted in order to fit the program to a schedule or time limit. The role played by various groups in the whole project from start to finish can be estimated and evaluated.

You now have some facts and figures which, when coupled with the intangible savings, such as smoother operation and maintenance, material quality control, purchasing advantages, and safety of operation, will sell the program because of its own prominence and economics.

Color

For Industrial Safety

THE color code approved for wartime use to mark danger spots in industrial plants is to be revised for peacetime use. This was a decision of the Sectional Committee on Safety Color Code, Z53, at its first meeting April 13. The committee had been organized under the procedures of the American Standards Association with the National Safety Council as sponsor as a result of requests from various organizations who had found the American War Standard color code valuable in their regular operations. The National Safety Council, as sponsor, has appointed Reuel C. Stratton, Travelers Insurance Company, as chairman of the committee.

In considering the approval of the wartime edition for peacetime use, the committee found that there was a demand on the part of some of the groups concerned for two other colors—orange and blue—in addition to the red, yellow, and green already provided. There was even a suggestion that there might also be a need for a violet or purple to indicate radiation hazards, and the committee voted to consider a suitable color in the purple range for this purpose.

The problems arising when any color, such as red or green, is used for different purposes were discussed at this meeting. For example, the use of red on safety cans for holding flammable liquids such as gasoline or kerosene has been questioned in view of the fact that red is used for marking fire extinguishers and other fire-fighting equipment. The war standard had recommended that in addition to the red paint, some clearly visible identification either in the form of a yellow band or the name of the contents should be stenciled or painted on the can.

Work done by a subcommittee during preparation of the war standard to define the limits of the colors to be used including selection of colors most readily distinguished by the colorblind will be taken up again by the peacetime committee. The tables defining the color limits in accordance with the American Standard Specifications and Description of Color and listing actual color samples meeting these requirements were completed after approval of the war standard. Recently there have been indications that possibly 10 percent of the male population is in some degree colorblind rather than 4 percent as thought at that time. This emphasizes the importance of this phase of the subcommittee's work. Harry J. Keegan, representing the Inter-Society Color Council and the National Bureau of Standards, will be chairman of the subcommittee responsible for all technical definitions of the colors to be used in the standard.

• • • See Color Chart on Following Pages • • •

A subcommittee on the colors red, orange, and yellow will have H. L. Miner, representing the Manufacturing Chemists Association, the National Fire Protection Association, and the National Paint, Varnish, and Lacquer Association, as chairman. C. W. Nickerson, representing the National Association of Mutual Casualty Companies, will be chairman of the subcommittee on green and blue. W. S. Rasmussen, representing the American Society of Safety Engineers, was appointed to study the possibility of using purple to identify radiation hazards; and W. M. Kennedy, representing the Department of the Army, will be chairman of a subcommittee on black and white.

As a guide to the committee in deciding on the colors to be recommended in an American Standard for marking physical hazards in workplaces, a chart showing what colors are recommended in other standards has been prepared. Since this information may be interesting to Company Members of the ASA, this chart in reproduced on the following pages.

THE USE OF COLOR IN SAFETY STANDARDS

	Red	*Orange*	*Yellow*	*Green*	*Blue*	*Black & White*	*Purple*	*Brown*
		American Standards involving the use of colors						
Building Exits Code A9.1-1949				Exit Signs				
Safety Code for Building Construction A10.2-1944	Red lts at barricades & piles of material							
	Red also for storage & transportation of explosives							
Scheme for Identification of Piping A13-1928	Fire Protection	Dangerous Materials		Safe Materials	Protective Materials		Extra Valuable Materials	
Uniform Traffic Control Devices for Streets & Highways D6-1948	Signal Lights							
	Stop		Caution	Go				
			Warning signs			Guide Signs		
			Highway marking lines to the left of which it is unsafe or illegal to travel			Marking lines for center lines, lane lines, etc		
Industrial Accident Prevention Signs Z35.1-1941	Danger		Caution	Safety instructions		Directional signs		
Identification of Gas Mask Cannisters K13-1930	All Gases		Acid & Organic Vapors	Ammonia	Carbon Monoxide	Acid = white		Acid & Organic Vapors & Ammonia
						Organic Vapors = black		
						Dust or smoke ½" stripe B or W.		
	Other Organizations							
Railroads	Stop		Caution	Go	Men Working		Used on some systems to indicate position of interlocking switches	
	Colored Labels per Freight Tariff No. 4							
Interstate Commerce Commission Regulations for Transportation of Explosives and Other Dangerous Articles by Freight.	Flammable Liquids		Flammable Solids and Oxidizing Materials	Nonflammable Gases		(White) acids and corrosive liquids		
	Flammable Gases							
	Fireworks							
	Explosives					(Red Printing on White) Poisons and Tear Gas		
	National Bureau of Standards							
Marking of Anesthetic Gas Cylinders R176-41	Ethylene	Cyclopropane		Oxygen	Nitrous oxide			Helium
	(CO_2 = Gray; CO_2 + O = Gray and Green; Helium + Oxygen = Brown and Green)							

(*Continued on next page*)

THE USE OF COLOR IN SAFETY STANDARDS

(Continued from bottom of preceding page)

	Red	*Orange*	*Yellow*	*Green*	*Blue*	*Black & White*	*Purple*	*Brown*
Red Electric Warning Lanterns CS87-41	Warning of a hazard (for motor vehicles)							
Electric Directional Signals for Motor Vehicles CS80-41			Directional signals to indicate intentions of vehicle operator					
Adverse Weather Lamps for Vehicles CS81-41		Adverse weather lamps		(optional)		Adverse weather lamps (white)		
Clearance Marker, and Identification Lamps for Vehicles CS83-41	Rear clearance lamps, rear identification lamps, and rear side marker lamps		Front clearance, and identification lamps and all side marker lamps except those mounted on or near the rear					
Electric Tail Lamps for Vehicles CS84-41	Tail Lamps							
Electric License-Plate Lamps for Vehicles CS85-41						License-plate light (white)		
Electric Stop Lamps for Vehicles CS86-41	Intention of operator to diminish speed or stop							
	American Marine Standards Committee (U.S. Department of Commerce)							
Distinctive Markings for Piping (on board ships)	Fire Main					Pneumatic (block) Drains & Scuppers (white)		
(21 other pipes are designated by combinations of colors. Copy of standard on file in ASA office.)								
Lights on Shipboard	Port Side running light			Starboard side running light		Forward running light & top of mast		
(Marine channel markings use Red and Black buoys and Red and White lights)								
	Suggestions from Paint Manufacturers							
du Pont	Fire Protection Equipment	Dangerous Part of Machines	Striking against, stumbling, falling, or tripping hazards	First Aid, & Gas Mask cabinets safety showers	"Do not move" or "Do not operate"	Traffic Control (aisle markings) & housekeeping		
Pittsburgh Plate Glass Co	(All aisles should be marked by painting the entire width a contrasting color or by thick stripes of a vivid color for boundary lines. "Danger Signal" colors with high visibility—for automotive equipment, cranes and certain conveyors. Also vivid color for movable bins.)							
Arco Company	Fire Protection Equipment	Danger Signals	Striking against, stumbling, falling or tripping hazards	Safety and First Aid Equipment	"Do not operate"	Traffic control & housekeeping		
	Suggestions Published by Insurance Companies							
Liberty Mutual Insurance Company	Fire Equipment					Alternate stripes for pillars, dead-ends & doorways		
						white top & bottom risers on stairs for housekeeping		

For Modern Materials Handling — Pallets

Giving impetus to modern methods in materials handling, specifications have been worked out for construction, design, styles and types of pallets

MASS distribution has always played an important part in maintaining the effective results of mass production. However, it was not until the war that industry became aware of modern materials handling methods on a large scale. The impetus given to the consideration of these methods came from the necessity of shipping and storing enormous supplies of all kinds of materials for the armed forces. This task was effectively carried out, and industry continues to utilize modern materials handling methods, although it has problems in this field.

The construction of pallets, which is an important tool in materials handling, constitutes one of these problems. For example, the sizes of pallets must be selected for adaptability to truck and freight car dimensions to utilize the maximum efficiency of the carrier. In order to be effective for shipment, the pallets must be constructed so that they will completely fill the truck body, less than 8 ft wide inside, or a railroad car, about 11 ft wide inside. Since the widths of the railroad car and the truck are different, the user must order his pallets constructed to fit his particular shipping needs.

Adaptability Is Of Prime Importance

Pallets must also be selected for adaptability to warehouse requirements—i.e. the efficient transportation and storage of the products in the warehouse—and they must be constructed to handle the specific kinds and sizes of the material they will carry. It is necessary, therefore, that the size, style, and construction of the pallet meet the storage needs of each user.

In spite of the implied difficulties of standardizing, minimum standard specifications have been worked out by the National Wooden Pallet Manufacturers Association for warehouse or returnable wooden pallets. These specifications can be utilized by the users of warehouse wooden pallets as the basis of requirements for their pallets with room for elaborations in design and sizes needed.

Definitions Worked Out for Different Types

Before listing the minimum standard specifications for the construction of these pallets, the National Wooden Pallet Manufacturers Association defines their most common designs, styles, and types. The two-way pallets, which permit the entry of forks from two sides only and in opposite directions; the four-way pallets, which permit the entry of forks on all four sides; and the eight-way pallets, which permit the entry of works on all four sides and from the angle of all four corners, are the designs listed. Definitions are also given for single-face pallets (with only one deck as the top surface) and double-face pallets (with both top and bottom decks). These double-face pallets come in two designs—the reversible which has identical top and bottom decks and upon which goods may be stacked on either side, and the non-reversible in which the top and bottom decks have different openings and upon whose top deck goods may be stacked.

The three types stated last are the flush stringer pallet in which the outside stringers are flush with the ends of the deck boards, the single wing or airplane pallet in which the outside stringers are set inboard a number of inches on the top deck while the stringers are flush with the ends of the bottom deck boards, and the double wing or stevedore pallet in which the outside stringers are set inboard of both top and bottom deck boards to accommodate bar slings for handling the pallet.

The specifications deal with the lumber used in pallet construction—requiring that the lumber be free of decay or any defect which will materially weaken the strength of the wood or hinder its proper fastening. Four groups of woods are listed as equally acceptable on a performance basis (for wooden pallet construction). With this list in mind the user can select the wood most suitable for his requirements.

In the discussion of deck boards the width of these boards and the edge boards of the top and bottom decks are specified. It is noted here that the structural strength and life-span of the pallet are dependent on the lumber content of the top and bottom deck boards. Two factors govern this—the amount of spacing between deck boards and the number of individual deck boards on each pallet face. The amount of lumber required for the deck boards in the faces is listed in two tables.

Not less than three stringers and not less than nine posts or columns are required. The section on stringers also lists their minimum dimensions.

Fasteners Are Classified

The most specific requirements of the specifications and the largest part of the document includes the discussion of the acceptable fastenings for wooden pallets. This report lists standard nails, annular ring (fettering) nails, drive screws, and bolts and nuts with the latter considered the most durable and effective fastenings and with drive screws and annular ring (fettering) nails considered the next strongest types of fastenings. It is stated that the least effected fastening method for pallets is the standard cement-coated nail.

The methods used in handling the various designated bolts and nuts in the construction of the warehouse

pallets are also taken up. For example, different sizes of nuts are recommended, depending upon the weight of the load the pallet is intended to carry.

In the section on drive screws, the correct number of drive screws to be employed at all bearing points for the various widths of deck boards is specified. That section dealing with annular ring or fettering nails also lists the number of annular ring nails that must be employed at all bearing points for the various widths of deck boards.

The size of box nails for various thicknesses of deck boards and types of wood is the last to be specified in this report. The nail spacing recommended is the same as was listed for drive screws and for annual ring nails.

Although this report by the National Wooden Pallet Manufacturers Association covers just the minimum standard specifications for warehouse wooden pallets and is to be used as a guide only in the construction of pallets for general use in warehousing and shipping, it is one step forward in the standardization of an important tool used in modern materials handling methods.

. . . FOR MODERN MATERIALS HANDLING

Australia Works On the Standard Pallet

The Standards Association of Australia was recently appointed by the International Organization for Standardization as secretariat for ISO Technical Committee 51 to consider the standardization of pallets for the unit load method of materials handling. Australia is one of the few countries which have endeavored to standardize their handling methods and equipment, and the constitution of this committee is considered a most important step in international standardization. The pallet is an item of handling equipment which both assists and affects planning, design, loading, packing, distribution, and even marketing. A standard pallet will provide a "module" for measuring and planning stores, transport vehicles, ships, factories, and terminals. Flow must be considered in design and distribution today as well as in production, and to achieve this it is necessary to have a known unit area which with sub-multiples and multiples can be used for the smaller and larger units found in industry.

The need for expeditious handling of materials in transit during the war led to the design and use of equipment which could effect economies. The continued use of handling equipment in peacetime is now assured and it is fast becoming general practice in all countries of the world.

Action in regard to standardization has already been taken in Australia. Many millions of pallets of one size and form are in use and though many sizes have been used by various organizations most eventually turn to the pallet in common use known as the standard sling pallet. This pallet has a nominal size of 48 x 48 in. and an actual size of 46 x 46 in.

The proposal for the international standardization of pallets was submitted by the SAA to the International Organization for Standardization (ISO) in 1946 at the request of the Bureau of Materials Handling of the Division of Industrial Development. After consideration by the Council of ISO, the project was approved and an ISO Technical Committee formed with Australia as secretariat.

To coordinate and present Australian views, a committee on Pallets for Unit Load Method of Materials Handling has now been constituted by the SAA and the inaugural meeting was held at Science House on October 29, 1948. The committee is fully representative of Australian manufacturing and transport interests and users. The chairman is J. J. Sheils, Deputy Director of the Division of Industrial Development. The committee is made up of representatives from—

The Bureau of Materials Handling
The Department of the Army
The Department of the Air
The Department of Land Transport
Australian & New Zealand Railways Conferences
Institution of Engineers, Australia
The Institution of Production Engineers
Maritime Services Board, Sydney
Melbourne Harbour Trust Commissioners
Associated Chambers of Manufacturers
Metal Trades Employers Association
Inter-state Steamship Owners' Federation
Overseas Shipping Representatives Association
Overseas Stevedores' Association
Master Carriers Association of New South Wales

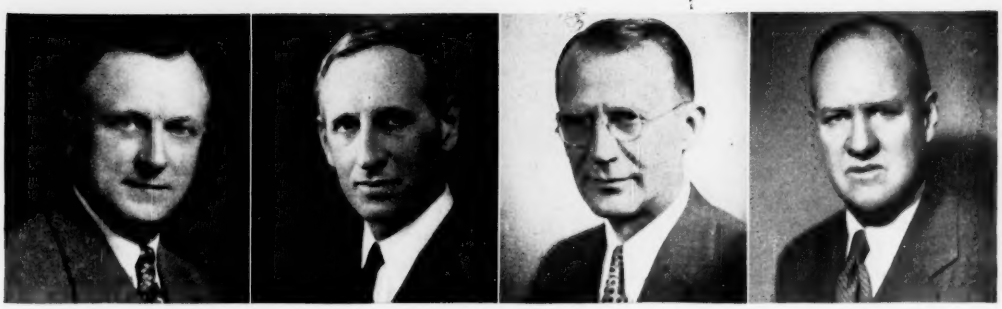
The first meeting of this committee discussed its relationship to the International Organization for Standardization and drafted a program for both international and Australian work. This program covers items suggested for international consideration and the collection of data. It promises to provide Australia not only with a means of establishing her handling problem on a sound basis but with a most important liaison with overseas practice.

Preston S. Millar

Preston S. Millar, president of Electrical Testing Laboratories since 1929, died suddenly June 17.

Mr Millar had been chairman of ASA Sectional Committee for Standards for Electric Lamps, C78, and member of Committee Z34 on Principles Underlying Valid Certification and Labeling of Commodities.

Fellow of the Illuminating Engineering Society, American Physical Society, American Society for the Advancement of Science, and member of the American Optical Society, American Institute of Electrical Engineers, and American Society for Testing Materials, he was president of the U. S. National Committee of the International Commission on Illumination from 1936 to 1948.



H. S. Osborne | P. H. Chase | Frank Thornton, Jr | G. F. Hussey, Jr

USNC Elects New Officers

NEW officers and members of the Executive Committee have been elected by the United States National Committee of the International Electrotechnical Commission. This action was taken prior to the IEC meetings in Stresa, Italy, June 13-18.

The recently elected officers are:

President: H. S. Osborne, chief engineer, American Telephone and Telegraph Company.

Vice-Presidents: P. H. Chase, chief engineer, Philadelphia Electric Company, and
Frank Thornton, Jr, engineering manager, association activities, Westinghouse Electric Corporation.

Treasurer: G. F. Hussey, Jr (Vice-Admiral, USN, Ret), secretary, American Standards Association.

A former vice-president and treasurer of the USNC, Dr Osborne is a Fellow of the American Institute of Electrical Engineers, Acoustical Society of America, American Physical Society, and the Institute of Radio Engineers. He is a member of the Joint Conference Committee on Standards, U.S. Department of Commerce; and the Industry Advisory Council, Federal Specifications Board. He is also vice-president and member of the Board of Directors of ASA.

Mr Chase is a member of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, and the Illuminating Engineering Society. He has been a member of ASA's Electrical Standards Committee since 1935. Until his election, he served ex officio on the Executive Committee.

Also a former member of the Executive Committee, Mr Thornton is a Fellow of the American Institute of Electrical Engineers; a member of the American Society of Mechanical Engineers; an associate of the Institute of Radio Engineers and the International Association of Electrical Inspectors. He is chairman of the Codes and Standards Committee of the National Electrical Manufacturers Association; member of the Electrical Committee and the Committee on Revision of the National Electrical Safety Code. In ASA activities, he is member of Standards Council, the Electrical Standards Committee, and the Mechanical Standards Committee representing the National Electrical Manufacturers Association, and is chairman of the Board of Examination.

Admiral Hussey, as secretary of the American Standards Association, is the administrative head of the association. He has taken a special interest in the international work not only in the electrical field but also in the general work of the International Organization for Standardization. He is attending the ISO meetings in Paris as a United States delegate.

Other members of the Executive Council are:

W. R. G. Baker, Radio Manufacturers Association

E. C. Crittenden, National Bureau of Standards

Paul Diserens, American Society of Mechanical Engineers

F. B. Llewellyn, Institute of Radio Engineers

J. J. Pilliod, American Institute of Electrical Engineers

Sydney Withington, Member-at-Large

Through the USNC, the electrical groups in the United States take part in international work on standards in the electrical field. The committee is made up of members of the ASA Electrical Standards Committee with the addition of representatives from the American Society of Mechanical Engineering and members-at-large.

Revised Temperature Scale Adopted by NBS

The National Bureau of Standards is now calibrating instruments in accordance with the international temperature scale as revised last October by the Ninth General Conference on Weights and Measures at their Paris meeting.

The scale is based on six temperatures—the boiling point of oxygen (—182.97 C); the freezing and boiling points of water; the boiling point of sulphur (444.60 C); the melting point of silver (960.5 C); and the melting point of gold (1063 C). The standard platinum resistance thermometer is used from the oxygen point to above 630 C. Higher purity platinum for the resistance thermometer and standard thermocouple has been specified.

Case History of the Standards on
Electric Discharge Lamps

By George L. Diggles

THE advantages of standardization to the consumer, the merchandiser, the manufacturer, and the engineer scarcely need reiteration here. It is obvious, therefore, that, in an industry that plays so important a part in our civilization as does lighting, standards are essential to the most satisfactory and economic use of available light sources.

In order to work out the necessary standards for electric light sources, in February, 1946 the Electrical Standards Committee of the American Standards Association approved the initiation of a project designed to provide for interchangeability of electric lamps. Sectional Committee C78 was formed to prepare standards for interchangeability of both incandescent and electric discharge lamps.

In 1939 and 1940 at the New York World's Fair in Flushing Meadows electric discharge lamps were first used publicly on a large scale. Since then the whole field of the use and manufacture of discharge lamps has expanded. The very rapid development of types and sizes of lamps and of accessory equipment has somewhat complicated the problem of providing complete interchangeability of these lamps. Electric discharge lamps now in relatively large production include general service fluorescent types ranging in size from 4 to 100-watts, long tube hot and long tube cold cathode fluorescent types in lengths from 42 to 96 inches, circular and semicircular fluorescent lamps, bactericidal lamps, mercury vapor, sun lamps and glow lamps.

While it is important that interchangeability be provided for lamp types of similar characteristics, it is equally important that interchangeability be prevented where characteristics are dissimilar.

In carrying out effectively its program for the standardization of electric discharge lamps ASA Sectional Committee C78 delegated to Subcommittee 2 the task of deriving suitable dimensional and electrical standards for electric discharge lamps. The subcommittee has been active during the past three years in correlating all available information relating to the dimensions and electrical characteristics of the various types of electric discharge lamps.

Classification	*Dimensional and Electrical characteristics have been published for these sizes**		
General Service (Proposed American Standards C78.400 through C78.409)	4-watt T-5 6-watt T-5 8-watt T-5	14-watt T-12 15-watt T-8 15-watt T-12	20-watt T-12 30-watt T-8 40-watt T-12 85-watt T-17
Instant Start (Proposed American Standards C78.600, C78.601)		40-watt T-12	40-watt T-17
Long-Tube Hot-Cathode Multiple-Burning (Proposed American Standards C78.801, C78.803, C78.805, C78.807)	42-inch T-6 64-inch T-6		72-inch T-8 96-inch T-8
Cold-Cathode Series-Burning (Proposed American Standards C78.1100 through C78.1105)	20-mm 52-in. 20-mm 64-in. 20-mm 76-in.		20-mm 84-in. 20-mm 93-in. 25-mm 93-in.
Bactericidal (Proposed American Standards C78.1200 through C78.1202)	8-watt T-5	15-watt T-8	30-watt T-8

*On a trial and criticism basis.

As a result of this work, in January of this year standards for 25 sizes of lamps were recommended by the subcommittee and approved by the sectional committee and these have been published for trial and criticism. The trial period will end with December, 1949. The proposed standards are:

For each type and size involved, the standards include tube diameter, lamp length, and electrical characteristics.

The committee is continuing work on additional sizes and types. Moreover, it is engaged at present in work on those classifications of electric discharge lamps that include circular and semicircular fluorescent lamps, mercury vapor lamps, multiple burning cold cathode fluorescent lamps, and flash tubes. It is expected that standards for some of these types of lamps will become available in 1949.

The lamp dimensions that have been listed are those necessary for drawing plans for the manufacture of lamp holders, lighting fixtures, and lighting installations.

A new sectional committee, C81, has been set up to establish base and holder dimensions for all types of electric lamps. In determining prac-

***Mr Diggles** is co-manager of lamp testing in the Electrical Testing Laboratories, Inc of New York City. For a number of years he has served as representative of the Electrical Testing Laboratories, Inc on various sectional committees under the procedure of the American Standards Association.*

He is a member of Sectional Committee C78 which handles standards for electric lamps, Sectional Committee C79 on nomenclature for glass bulbs and moulded glass flares for the use in the manufacture of electric lamps and electron tubes, and he is working on Sectional Committee C81 which is dealing with standards for electric lamp bases and holders.

ticable lamp base and holder requirements for electric discharge lamps, this committee will utilize the lamp dimensions recommended by Subcommittee 2.

The electrical characteristics shown in the proposed standard for each lamp size include the lamp operating volts, current and watts, the design starting volts and the preheat current, and the preheat time. These characteristics will form the basis for the work on the standardization of ballasts, carried out by another new committee, C82.

Since uniformity in the color of light sources that are identified by the same trade names is important to the consumer, a group of experts has been studying the various means for insuring correct definition of each popular color. Thus far they have recommended the color coordinates of the International Commission on Illumination for five colors of fluorescent lamps. They are: Daylight; 4,500 white; white (3,500); warm white; and soft white.

Internationally, a committee of the International Electrotechnical Commission has been working on lamp bases and holders for many years. Its work has been confined primarily to incandescent lamps, but now this committee is beginning to take up electric discharge lamps as well. The IEC has just organized a new committee, Advisory Committee 34, which closely parallels the work of Sectional Committee C78. The American Standards will be submitted to Advisory Committee 34 for consideration as international standards. Through coincident development it is to be hoped that standards of world-wide acceptability may be established.

Copies of the Proposed American Standards on dimensional and electrical characteristics of fluorescent lamps may be purchased for 25 cents each from the American Standards Association, 70 East 45th Street, New York 17, N. Y.

If more than ten copies are needed, lot orders, which may consist of the same or assorted standards, may be obtained at the following prices:

10 to 24 copies 20 cents each
25 to 99 copies 17½ cents each

For the proposed standards purchased in sets, quantity prices are:

	With Binder (per set)	*Without Binder (per set)*
1 to 25 sets	4.50	2.75
25 to 99 sets	4.25	2.50
100 or more sets	4.00	2.25

Comments on these proposed standards should be sent to the American Standards Association, 70 East 45th Street, New York 17, N. Y.

Book Reviews

Medical X-ray Protection up to Two Million Volts, National Bureau of Standards Handbook 41, 49 pages, 6 line cuts, 9 tables, 15 cents, obtainable from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

The increasing use of high-energy x-rays in medical diagnosis and treatment has presented new problems in all phases of radiation protection and shielding. Recommended standards of safety for the installation and use of high-voltage x-ray equipment are concisely set forth in this new handbook, published by the National Bureau of Standards.

This handbook was written by a subcommittee of the National Committee on Radiation Protection composed of representatives of radiological societies, electrical societies, and the National Bureau of Standards. It contains instructions for meeting presently accepted standards as well as advisory recommendations that should be applied where possible. Rules are given for working conditions, survey and inspection of installation, planning an x-ray installation, structural details of protective barriers, and specific types of installations. A chapter on electrical protection treats such topics as high-voltage circuits, grounding inspection and maintenance, warnings and instructions, and first-aid and fire-extinguishing devices. Also included are tables and graphs for determining the requirements of protective barriers and distance protection in specific cases.

Symposium on Functional Tests for Ball Bearing Greases, Special Technical Publication No. 84 (American Society for Testing Materials, 1916 Race Street, Philadelphia 3, $1.75)

The papers and discussions presented in this 104-page booklet were given at the 51st ASTM Annual Meeting. The papers cover methods for the aircraft industry; grease as an oil storehouse for bearings; laboratory performance tests for anti-friction greases; service experience; and factors affecting simulated service tests.

Plant Production Control. 2nd Edition. By Charles A. Koepke (John Wiley & Sons, Inc, 440 Fourth Avenue, New York 16, N. Y., $5.50)

The primary purpose of this 568-page book is to teach and demonstrate methods of controlling the flow of materials through any type of commercial enterprise. It presents the problems of production planning and control as they apply to a variety of industrial situations. There is particular emphasis on the need for a balanced organization in which the several groups act as friendly critics of each other.

The book is intended for use by industrial and design engineers, tool designers, inspectors, estimators, inventory control clerks, and production control personnel.

Acrylonitrile Chemical Safety Data Sheet SD-31. (Manufacturing Chemists' Association, Inc, 246 Woodward Building, Washington 5, D. C., $0.20)

A complete list of the chemical's properties—physical, chemical, and hazardous—is offered, and essential information for safe handling and use is included in this 17-page booklet. Shipping containers, unloading and emptying, storage, all phases of handling from employee education to tank and equipment cleaning and repairs, waste disposal, and health hazards and their control, are discussed. One of a series of chemical safety data sheets published by the MCA.

Betanaphthylamine Chemical Safety Data Sheet SD-32 (Manufacturing Chemists' Association, Inc, 246 Woodward Building, Washington 5, D. C., $0.20)

Designed for supervisory staffs and management, this manual presents essential information for the safe handling and use of this chemical. The topics handled are the important physical and chemical properties of Betanaphthylamine, the usual shipping containers and methods for their unloading and emptying, container storage and handling, and recommended personal protective equipment. Health Hazards and Their Control are covered authoritatively in a section prepared by the Medical Advisory Committee of the Association.

Standards of Retail Practice—Men's Wear, revised edition. (Retail Trading Standards Association, Inc, 356-366 Oxford Street, London W1, England, 1 s, 6 d, post free)

Of interest to the retailer are the RTSA definitions of terms and general rules for the correct presentation of descriptions for all merchandise, as well as those applying specifically to men's wear. This 35-page booklet covers the same topics as those covered in the booklet on furnishing fabrics, listed above, it also includes specifications for tailoring claims, and an extensive glossary of trade terms.

Standards of Retail Practice—Piece Goods (Retail Trading Standards Association, Incorporated, 356-366 Oxford Street, London, W.1, 1s, 6d., post free)

This 36-page booklet gives voluntary standards and definitions for various materials and fabrics, contains a glossary of 150-odd trade terms in common use, discusses several finishing processes, gives data on proprietary textile fibres. General rules on advertising are also included.

Company Member Conference Considers Problems of the Day

What industry wants and needs — CMC speaks and listens

A LIVELY exchange of questions and answers on problems facing companies that are putting into effect the new American Standard Unified and American Screw Threads was one of the principal features of the Philadelphia meeting of the Company Member Conference May 19. Members of the Conference came to the meeting from all parts of the east coast, and as far west as Detroit and Chicago, with one representative of a Canadian company from Toronto, Ontario. S. H. Watson, RCA Victor Division, Radio Corporation of America, chairman of the Conference, presided. On his invitation, a group of those present at the May 19 meeting stayed over for a trip to the Princeton Laboratories of RCA the following day.

The discussion on screw threads was touched off by a detailed explanation of what the new standard means to industry, presented by Frank P. Tisch, chief engineer of the Pheoll Manufacturing Company. As vice-chairman of the Sectional Committee on Screw Threads, B1, Mr. Tisch took a prominent part in the negotiations leading up to the British-Canadian-United States unification agreement as well as in the technical work of putting that agreement into effect in the American Standard. (See page 133) for an extensive abstract from Mr Tisch's speech.)

Other company problems that called forth spirited comment from the floor were nomenclature of metal end products and the status of the American Standard for twist drills.

F. L. Creager, Superintendent of the Model Shops, RCA Laboratories, described some of his experiences as a user of the twist drill standard and asked what could be done to encourage greater use of the standard on the part of the makers of twist drills. It was pointed out that this problem would undoubtedly be solved if there were sufficient demand on the part of the user companies.

The question of nomenclature of metal end products centered around a report presented by R. A. Frye, Westinghouse Electric Corporation, chairman of the Conference's subcommittee on the subject. Charts had been prepared by the subcommittee showing the various end product classifications now recognized by the principal producing industries. As a result of its study, the subcommittee concluded that weaknesses in existing terminology for metal end products, coupled with the fact that in some cases there is a lack of such terminology, is a "source of considerable confusion in industry and particularly troublesome to the consumer interests when specifying on drawings, engineering information, specifications, and purchase orders."

"As a result of the subcommittee's investigation and study, it further concludes that development of uniform metal end product terminology is both desirable and practicable," it reported.

Nomenclature Recommended For Metal End Products

The subcommittee recommended appropriate ASA activity (such as initiation of a project, or assignment of the problem to an existing committee) aimed at the development of standard nomenclature of metal end products, defined in terms of dimensions rather than process. It suggested that this nomenclature cover wrought metal bar, strip, sheet, and plate. The classification proposed for bar, plate, strip, and sheet is as follows:

Thickness In.	Width In.	Classification
0.250 and over	Up to 6, incl	Bar
Over 0.250	Over 6	Plate
0.249 and under	Up to 6, incl	Strip
0.249 and under	Over 6	Sheet

The subcommittee also recommended that definitions or nomenclature be developed for metal end products to cover wire, rod, pipe, tube, tubing, hose, and other end products not included in the original classification.

These recommendations are being referred to the Standards Council at its meeting June 16.

In addition to these discussions of specific standardization problems, the Conference heard Vice Admiral G. F. Hussey, Jr (USN, Re-), secretary of the American Standards Association, describe the present status of the Association, and Colonel Louis J. Tatom, co-director of the Armed Services Electro Standards Agency, tell about the changes made recently in that organization and about its accomplishments. (For Colonel Tatom's speech see page 135.)

Year's Activities Summarized and Reported

Admiral Hussey told the Conference that the output of standards during the past year has been remarkable, with the adoption of the American Standard Unified and American Screw Threads, B1.1-1949, as the outstanding accomplishment. Work has been particularly active on photographic standards, lamp standards, and building code requirements, he said. As secretary of the ASA, his responsibility is to make sure that the American Standards Association runs efficiently and that the funds provided by industry are used most effectively, he told the Conference. The Program of Activities which he submitted early this year to the Board of Directors, Member-Bodies, Standards Council, and Company Members represents the first attempt to explain in detail to all these groups what is being done by the ASA and how much it costs. If the job for which the Association was set up is to be done effectively, the people for whom the Association operates and who in effect run it, must understand what standardization is, how it operates, how much it

costs, and why it costs so much, he said.

In line with this principle, a Budget Planning Committee, appointed by ASA's president, has evolved a scheme, which is now being put into effect, intended to assure the Association a yearly income rather than its present "hand-to-mouth" existence. Under this scheme, the technical program for the forthcoming year is planned by the correlating committees. The ASA staff secretaries of the correlating committees work with the chairman to provide figures showing what the costs will be for the work planned. On the administrative side, a budget for administration, publicity, promotion, and similar nontechnical services is developed by the ASA secretary. This proposed budget is to be completed by June 15 for the following calendar year, and after preliminary approval by the Finance Committee will be submitted to the entire membership, including Company Members. In September of each year a meeting will be called at which all the supporting organizations — trade associations, technical societies, and company members—will be invited, to consider the budget in detail and to determine how it can be guaranteed. Following this meeting, a report will be given to the Board of Directors on what the budget will be. The Board then has the responsibility of approving the budget and going to the organizations concerned for the money needed.

In addition to the status of the ASA itself, Admiral Hussey commented on the record of American industry's cooperation in international standardization.

"Obviously it is not the place of the administrative head of the ASA to tell industry what it should or should not do in international standardization," he said. "However, I feel that industry does not understand what international standardization is and does not realize how much it can gain through cooperation in the international projects."

Participation in ISO Is Urged

The objectives of the International Organization for Standardization are to secure unification and coordination of national standards to the end that the standards of each country—the United States, Great Britain, France, Sweden, Brazil—all have similar technical requirements, he explained.

The purpose of the technical committees of ISO is to examine the standards of the various countries, see where the differences are, and determine whether suggestions can be made for bringing them into greater agreement. When suggestions for agreement are made, the document becomes an ISO recommendation and is sent to the individual countries. From then on it is up to the countries themselves to decide what shall be done.

This standardization procedure is important, Admiral Hussey explained, in the use of American materials in foreign countries and in the use of foreign-made materials in this country. It is particularly important when requirements may become part of the police regulations of a country. For example, he said, a European country recently adopted a regulation that barred the use of American-type sealed-beam headlights on new cars after the first of January 1949 and on all cars after the first of January 1950. Because of the importance of this action to American industry, a representative of the Society of Automotive Engineers and the Automobile Association of America sat in on meetings of ISO/TC22 on Automobiles last fall.

The United States is participating in only eight of the 69 ISO projects.

"The only reason I can see for this is that it has not been brought home to American industry what international standardization means to it," Admiral Hussey told the Conference. "All of you should use your utmost efforts to make it clear to your organizations that it is to their advantage in getting their products used in other countries to cooperate in this international work."

ASESA— What It Is and Does

By Colonel Louis J. Tatom

Signal Corps, USA

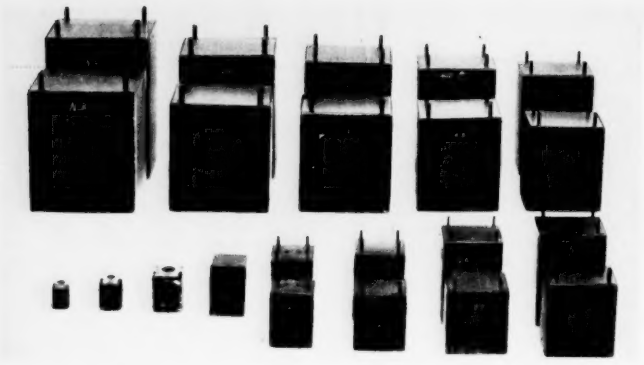
Army Co-Director, Armed Services Electro Standards Agency

THE Armed Services Electro Standards Agency is a joint service organization engaged in preparing and promulgating standard Joint Army-Navy (JAN) specifications for electronic parts and materials for use in communications and electronic equipments of the Armed Forces and in designating approved sources of supply for these items.

In the early days of World War II, both the Army and the Navy recognized the need for positive action to reduce the vast number of different styles and types of electronic component parts in use in the various equipments. In some cases, there were hundreds of parts having the same electrical values and characteristics and designed to perform the same function, but they were not physically interchangeable. Some of these were of poor quality and were unsatisfactory for use in service equipment. Accordingly, separate organizations were formed by the Signal Corps of the Army and the Bureau of Ships of the Navy to effect standardization within the individual services.

The necessity of joint cooperation in the standardization program was soon apparent and in December of 1943 the Army-Navy Electronic Standards Agency was established for this purpose. Concurrently the standardization of electronic parts extended to other branches of the Army and Bureaus of the Navy with the coordination being effected by the single joint agency. This Agency was a "merger" activity long before the Unification Act and is a good example of joint cooperative effort.

In March 1949, a new Charter was signed by the Assistant Secreta-



These 22 standard transformer cases replace 10,000 sizes and shapes.

ries of the three Departments of the National Military Establishment, outlining the functions of this organization and redesignating it as the Armed Services Electro Standards Agency (ASESA). This Agency is staffed by personnel from the three Departments — the Army Signal Corps, the Navy Bureau of Ships, and the Air Force Air Materiel Command—actually working side by side on joint projects of common interest.

Electronic and communications equipment, like all other equipment intended for use in the Military Establishment, must be built to "stand the gaff." It must be able to operate under a wide variety of conditions and to withstand severe shocks and vibration as well as extremes of temperature and humidity. At the same time, this tough equipment must be made as small and light as possible. The component parts, or the bits and pieces, that go to make up this equipment must individually meet the military requirements of the end items for ruggedness and dependability.

The Research and Development Board Electronics Committee, acting through its Components Panel, is coordinating research and development work on electronic components in the various Government laboratories, in universities, and in industry. The sole purpose of this work is to improve the quality and dependability of components for military electronic equipment. Strong emphasis is being placed on miniaturization and unit packaging of whole subassemblies. The end results of this research and development work is passed on to this Agency, where it is incorporated in all new and revised specifications for standard components.

Since the electronics industry will ultimately have to make these components for Government use, close coordination with industry is necessary to insure that the specifications will be practical and feasible in manufacture.

RMA-IRE Specifications Included Where Practical

In the first draft of a specification for a component part, the general requirements of the individual military services, and wherever practicable the requirements of the corresponding RMA-IRE specification, are included. In order to make sure that our specifications are realistic, a working agreement was made with the Radio Manufacturers Association last March whereby all first drafts are circulated, not only to the interested government services, but to commercial manufacturers of the item who submit their comments to the RMA Data Bureau. Comments from industry are screened by the Data Bureau, and a correlated reply representing the manufacturer's opinion of the specification is sent to ASESA. These suggestions, along with those from the Armed Forces, are reconciled and incorporated into a single specification in the National Military Establishment form representing the best compromise between the exacting military requirements and the limitations of present-day quantity production-line methods. This same procedure is in effect for revisions and amendments to existing specifications.

The final specification may require several draft circulations under the above procedure until an agreement has been reached. While this may seem unwieldy, the benefits to the Government in insuring that interchangeable quality items are available, and in bringing to the industry the advances made in the electronic science resulting from Government-sponsored research and development are well worthwhile.

When a new or revised specification is finally completed and concurred in by the interested Services, and industry, it is processed through the Munitions Board Standards Agency and issued to the Armed Services as a National Military Establishment (NME) document, though it is still designated as a JAN specification.

In addition to responsibility for the preparation of JAN specifications for standard components, this Agency also has the very important responsibility of designating approved sources of supply for each one of these parts. When a JAN specification is issued, all manufacturers are invited to submit samples of their products made under this specification, for qualification testing and approval. This testing work is done for ASESA by the Signal Corps Engineering Laboratories and the Navy Materiel Laboratory. When an item is tested and is found to meet the specifications, a qualification approval certificate is issued by ASESA to the manufacturer of that item, designating him as an approved source of supply. This information is then given to all procurement and contracting officers in the three Departments.

In the event the producer fails the qualification test, the test report and the tested samples, representative of the failures, are returned to him along with a recommendation by the agency for correcting the weaknesses. The manufacturer is encouraged to resubmit samples; but in order to conserve testing time and funds, a reasonable assurance that the cause of failure has been corrected must be made before the samples will be accepted for retest.

It is axiomatic that the value of any standard depends upon the extent of its use. Each JAN specification contains a clause making it encumbent upon all procurement and contracting officers to purchase only these standard JAN components for maintenance stock and to specify JAN components in all new electronic equipment. A complete list of approved suppliers who have proven their ability to manufacture these standard parts is prepared periodically by ASESA and published in the Joint Army-Navy-Air Force Qualified Products List. This provides procurement officers and manufacturers with ready information as to where these standard parts may be

procured, and insures the application phase of the standardization program.

To further aid the services and the manufacturers of equipment in the use and application of JAN standard parts, the Armed Services Electro Standards Agency has prepared a Preferred Parts List for use as a guide in the selection of commonly used components in the development and maintenance of electronic equipment. This list contains the most commonly used electronic components for which preferred form factors, values, and tolerances have been selected. Consideration has been given to cost and production factors which are reflected by the list in the form of components screened for the best reasonable tolerances used in the maximum of engineering applications, which will not appreciably increase the cost of purchase when bought in large quantities.

List Has Three Classifications

This first list contains components falling in three JAN classifications as follows:

(*a*) JAN specification components which are available from sufficient sources.

(*b*) Those components for which a JAN specification has been written but which are not available from industry at present and for which an acceptable substitute with the same electrical and physical characteristics will have to be used until the specification is revised or parts become available.

(*c*) Those components commonly used for which no JAN specification has been written. In these cases a JAN specification is either in or will shortly be in process.

Where no qualified sources of supply have been established for items which are essential in equipment production, ASESA is planning to issue lists in supplement to the Qualified Products List mentioned above which will contain recommended "near standards" or *temporary approved substitutes*. Items will be included in this list when, on the basis of factual engineering data, it is believed that they will meet the qualification test requirements of the specification or, when the items fail to meet the tests by a small margin and sufficient *qualified* sources are not available. These lists will also serve as a guide in design and procurement.

While the benefits of standardization are many and far-reaching, the whole program would be fully justified just on the basis of reduction of styles and types, interchangeability, and improvement of quality and dependability.

By reducing the multiplicity of types to a few standard types, manufacturing cost is reduced and the problem of procurement and supply is greatly simplified. Considerable bulk storage is eliminated, bin space requirements in the various depots is reduced, and Navy Shipboard binning of repair parts is made feasible. This naturally reduces the number of catalog items, stock records, shipping documents, and other paper work which, in turn, is reflected in reduced personnel requirements and in more efficient supply operations.

Before and After Standardization

Component	Styles & Types BEFORE	AFTER
Plugs—Telephone	120	14
Jacks—Telephone	400	39
Vibrators	1400	18
Resistors—Variable Wire Wound	29	9
Resistors—Fixed Power	90	38
Resistors—Accurate	190	14
Resistors—Variable Composition	16	4
Resistors—Low Power	7	4
Rheostats—Power	22	12
Material—Molded Thermoplastic	1000	46
Material—Molded Thermosetting	100	16
Rods and Tubes—Laminated	300	26
Sheets and Plates—Laminated	32	16
Resistors—External Meter	15	3
Shunts	11	3
Switches—Toggle	110	23
Switches—Sensitive	48	7
Capacitors—Air Trimmer	17	3
Capacitors—Fixed Mica	123	17
Capacitors—Fixed Ceramic	85	10
Capacitors—Paper Metal Cases	312	28
Capacitors—Electrolytic	82	12
Capacitors—Paper Molded Cases	26	11
Capacitors—Variable Ceramic	31	5
Cable—Flexible (Construction)	76	1
Meters	37500	3700
Crystal Holders	350	3
Electron Tubes	2700	190
Transformer Cases	10000	22

Development of materials and components has been effected through aid given manufacturers and by the results of qualification testing and analysis of these results by this agency. This aid has enabled manufacturers to improve their products to the extent they can successfully meet requirements of JAN specifications.

Quality Improvements

JAN-P-14	Development of Sources of Arc Resistant Material
JAN-P-13	Development of Low Loss Moisture-Resistant Laminate
JAN-P-79	Development of Low Loss Moisture-Resistant Tubing
JAN-I-6	Development of Sealed Meters
JAN-I-10	Development of Very Low Loss Ceramics
JAN-C-76A	Development of Small Diameter Hook-Up Wire
JAN-R-26	Development of Fixed, Wire Wound, Power Resistors to meet Characteristic "F" requirements. (Thermal Shock in Water Followed by Salt Water Immersion)

Interchangeability is Ultimate Goal

Interchangeability, which makes it possible to use any standard part in any piece of electronic equipment where it is applicable, is the ultimate goal of design and maintenance people. The advantages are obvious.

High quality and dependability are probably the most important objectives of the standards program. Just as a chain is no stronger than its weakest link, so each piece of electronic communication or control equipment is no more reliable than the parts and materials of which it is made. Since the failure of an important piece of electronic equipment at a crucial time could cause the failure of a mission and serious loss of life, dependability is of paramount importance. JAN components and materials are designed to give that dependability.

To date about 80 percent of the conventional component parts and materials used in electronic equipments are covered by JAN standard specifications. This work is progressing as fast as personnel limitations will permit. However, the task will never be completed; it is a continuing process. Improvements in the electronics field through research and development, as well as new military requirements, necessitate constant revision of old specifications. The trend toward miniaturization and the ever-increasing demands for smaller and lighter equipments has opened a whole new field for standardization. This Agency, by entering this field at the beginning and guiding the development of miniaturization toward certain standard practices, will greatly simplify the problem in the future when these new items are to be standardized.

Although most electronic components are covered by JAN specifications, many are actually not available to the Services as maintenance parts or to manufacturers of new equipments. It is therefore necessary to grant waivers for the use of approved substitute parts. Since many

of these standard parts are new items and most of them are specialized for military requirement, the parts manufacturers are not currently producing them for commercial use, and are therefore unable to make them for the Government in small lots at a reasonable price. To overcome this difficulty, and make JAN parts available when and where they are needed, several plans are now under consideration by the Services and the Munitions Board to make large-order buying possible and thus induce industry to produce these parts.

Standardization and establishment of adequate approved sources of supply for standard items are essential features of the Industrial Mobilization Planning program. In any emergency, if the component parts and materials are quickly available in adequate quantities, the equipment manufacturers can readily assemble and deliver the finished end items. Conversely, if the bits and pieces—and the right kind of bits and pieces—are not available, then equipments cannot be delivered when needed.

With a view toward having JAN electronic components in current production, the chairman of the Munitions Board recently requested the American Standards Association to consider the adoption of the JAN components as American Standards for commercial use where applicable. Acting favorably on this request, the American Standards Association has set up the organizational machinery for considering and processing these JAN Standards into American Standards. Several equipment manufacturers are already using JAN parts, when available, in their high-grade equipments where dependability is of prime importance.

It is expected that JAN parts—the best parts that can be made—will soon be available in quantity, and will be in use in all Armed Services equipment. Then, and only then, will the electronics standardization program be fulfilled.

What B1.1-1949 Means to Industry

By Frank P. Tisch

The American Standard Unified and American Screw Threads for Screws, Bolts, Nuts, and Other Threaded Parts, B1.1-1949, was published late in May. With an advance copy of the new standard in his hand, Mr Tisch took occasion at the May 19 meeting of the Company Member Conference to explain the background of some of the technical details. The standard, he said, represented the culmination of a 30-year period of negotiation to secure the interchangeability of screw threads produced in the United States, Great Britain, and Canada, made possible by the signing of the declaration of accord on November 18, 1948.

The main part of Mr Tisch's paper is given below.

THE increased use of power drivers and wrenches for assemblies brought out the need for an allowance to prevent the seizing and galling of Class 2 tolerance screws, bolts, and nuts. This led to several meetings in 1940 at which the need for an allowance was discussed. The subject then remained static until it was reactivated in 1945 at a series of joint industry conferences. At these conferences the need for an allowance was discussed, with consideration given to the plated product as well as the plain product. At that time it was agreed that the importance of pitch diameter fit on strength, work load capacity, fatigue life, and permanance of thread fastenings has been over-rated; that lead, ductility of materials, avoidance of stress concentration, proper tightening, and many other factors influence performance more than slight loss in engagement resulting from the looser fits. Consideration was given to the possibility that loads might be more evenly distributed in the looser fits by clearance which allows members to position themselves to each other over a greater length and area than in the tighter fits.

It was submitted that current tolerances for commercial nuts were unnecessarily restrictive and impractical from a cost standpoint for a mass-produced product; that commercial nuts outside the limits have been produced and accepted for years past; and that the oversize more often than not is advantageous to the user where high-cycle wrenching and plated assembly are involved.

The Class 2 tolerances in the internal threads and nuts were investigated and found to be too restrictive in the numbered sizes and quite liberal in the larger fractional sizes.

The joint industry conferences developed a recommendation to the ASA B1 Sectional Committee which included a statement that the allowance was to be placed on the external thread and suggested suitable allowances and tolerances for a new Class 2 external thread to be known as a Class A thread and tolerances for a new Class 2 internal thread to be known as a Class B thread. Subcommittees 5 and 6 of Sectional Committee B1 were assigned to formulate the tolerances and allowances conforming as close to the original recommendation as practical and to work in conjunction with Subcommittee 1 of the B1 Sectional Committee in the preparation of a revision to the American Standard Screw Threads for Bolts, Nuts, Machine Screws, and Threaded Parts, B1.1-1935.

As the subcommittee work progressed, it was noted that the pitch diameter tolerances for the old Class 2 threads were predicated on pitch only and it soon became apparent that it would be desirable to develop a formula that would provide more

tolerances for the fine thread series where the diameter and length of engagement were greater than for the same pitch in the coarse thread series. For example, the NC2 7/16-14 size having $7\frac{1}{2}$ lineal inches of thread measured on the pitch diameter had the same tolerance as the NF2 7/8-14 which had 32 inches of thread. Obviously, more tolerance was needed and this resulted in the 2A formula which was weighted for diameter, length of engagement, and pitch with an allowance factor of 30 percent of the tolerance value. Tolerances and allowances for the numbered and fractional sizes in the coarse and fine thread series were calculated and the 2A thread was established. The tolerances for the 2B internal thread were calculated by using 130 percent of the 2A external thread values. The new tolerances and allowances were found to conform very closely with the original recommendations of the joint industry conference and considered to be satisfactory.

Conferences Held on Tolerances for Special Uses

A series of conferences including representatives from Great Britain, Canada, the Interdepartmental Screw Thread Committee of the National Bureau of Standards, and Sectional Committee B1 last July revealed the necessity for the development of suitable tolerances and allowances to replace the old Class 1 for ordnance and certain special uses. At the same time there appeared to be a need for a new thread classification to replace the old Class 3 where the thread tolerances were to be developed on the principle of the Class A formulation without an allowance for applications where closeness of fit and accuracy of angle and lead of thread are essential.

The 2A and 2B tolerances extend from the #1 size through the #12 size in the American Screw Thread and from the $\frac{1}{4}$ in. diameter through the 4 in. diameter in the Unified Coarse Thread series. In the fine thread series, the 2A and 2B tolerances are from the #0 to the #12 in the American Screw Threads and from the $\frac{1}{4}$ in. diameter to the $1\frac{1}{2}$ in. diameter in the Unified Screw Threads.

The 1A external thread and the 1B internal thread Unified tolerances were developed with the use of a factor with the 2A formula from the $\frac{1}{4}$ in. diameter to the $1\frac{1}{2}$ in. diameter in the fine thread series and to 4 in. in the coarse thread series with same allowances used in 2A external threads. The 3A external thread and 3B internal thread Unified tolerances were derived from the 2A tolerances and cover the same size range as the 1A and 1B without an allowance. Old Classes 2 and 3 which have been extensively used have been printed in the body of the new standard and the old Class 1 which is obsolete has been reproduced in the appendix for information only.

It is interesting to observe the following note at the bottom of the 1A and 2A external thread tables which reads: "The maximum dimensions of threads which are electroplated or have coatings of similar thickness will be increased by the amount of the allowances." This note has been added to establish the fact that Class 1A and 2A external threads that have been plated will be gaged in basic Go Ring Thread Gages having a size equal to the old Class 2 Go Gage.

Plating thicknesses can be established and standardized within the allowance for commercially threaded parts to the mutual advantage of users and producers.

The American and Unified Screw Thread Standard presents an entirely new concept of thread classification. With the old standard, class in each instance had been misconstrued as fit with a strong implication that both components must have the same class of tolerances—for instance, the idea that a Class 2 external thread must be used with a Class 2 internal thread and that a Class 3 external thread must be used with a Class 3 internal thread. In the Unified Screw Threads, class signifies tolerance or tolerance and allowance. Fit is determined entirely by the selected combination of classes for external and internal threads of mating parts.

Frank P. Tisch

Mr Tisch, *chief engineer of the Pheoll Manufacturing Company, is vice-chairman of the Sectional Committee on Standardization and Unification of Screw Threads, B1. This committee, sponsored by the American Society of Mechanical Engineers and the Society of Automotive Engineers, under the procedure of the American Standards Association, was responsible for the United States' part of the technical work in the British-Canadian-United States unification agreement. Mr Tisch signed the agreement in Washington on behalf of the ASME, the SAE, and the ASA.*

New and Old Threads Are Interchangeable

The important fact to remember is that the new threads are entirely interchangeable with the old threads and that the new threads will provide far more latitude in design than was possible with the old threads. In the American and Unified Standard, excepting for Class 2 and 3 which remain as is, the external threads of all classes will be classified with the suffix "A" and the internal threads, with the suffix "B".

Sectional Committee B1 voted on April 14:

"That the Sectional committee go on record as favoring participation in the ISO/TC 1 Technical Committee activities for the purpose of promoting the adoption of the principles of Unified and American Screw Threads as the international standard."

Five delegates are meeting with the British in London to discuss the unification of the numbered sizes and high-temperature bolting thread and similar subjects and are attending the ISO meetings at Paris.[1] We understand that the British plan to submit the Unified thread at the Paris meeting.

NOTE: Mr Tisch also called attention to the fact that the sectional committee has given a great deal of consideration to the transition period during which industry will be putting the new standard into effect. It has discussed the problem in many meetings during the past few months, and as a result, issued the statement published on page 162 of the June issue of STANDARDIZATION. This statement says in part:

"Producers and users have agreed that implementation of the new standards should proceed as rapidly as transition can be effected, and that inspection should be governed accordingly. They recommend, however, that for the time being neither the new nor the old classes as they apply to screws, bolts, nuts and similar threaded fasteners, should be mandatory except for specific applications agreed upon by consumer and producer."

[1] These meetings of ISO Technical Committee 1 on Screw Threads and Technical Committee 49 on Thread Tolerances were held June 28-30.

Japan Revives Its Standards Program

IN the past year in Tokyo, Japanese industrialists and technical experts have gotten together to take steps vital to the industrial rejuvenation of their country. With the aid of American technical experts, they have set up machinery for the development of standards. Some of their work has dealt with the reorganization of prewar associations that handled standardization—particularly to redefine their functions; some has been directed to the establishment of new standards organizations.

The inter-relationship of the Japanese standards organizations is complex. Handling the function of developing and approving standards is the Japanese Industrial Standards Committee. This committee has taken over the functions held before the war by the Japanese Engineering Standards Committee as the national standards body in Japan. Working with the Committee is the Standards Division of the Japanese Agency of Industrial Science and Technology. The Standards Division provides the various technical committees of the JISC with secretaries to assist them in this work. In addition, technical experts from laboratories as well as from the bureaus and other agencies of the Ministry of Commerce and Industry work closely on these problems with the Standards Division and the JISC. The Agency of Industrial Sciences and Technology is one of the Ministry's agencies. The standards approved by the JISC are published by the Japanese Standards Association, a voluntary group whose over-all task is to promote a wider knowledge of them and to encourage their use.

Work is still being done on the organization of the JISC. At the present time the Japanese Industrial Standards Committee is regularizing in writing its own development procedures. Although following in general the same principles on which the American Standards Association procedures are based, these procedures have not up to the present time been put into writing. It has been suggested that the JISC form a council somewhat equivalent to the ASA Standards Council for the purpose of screening proposals for new projects and of reviewing standards. This council would determine whether the procedure has been properly followed and whether the proposals are in line with the Committee's policy. Accordingly, the standards development procedure and organization charts of the ASA have been sent to Japan.

To further aid in the JISC and the JSA, the ASA has given them permission for reprinting, translating, and distributing American Standards. This permission will terminate when the foreign exchange situation allows the resumption of normal dealings between the American and Japanese associations.

Research Is Done Within the Agency

The Japanese Agency of Industrial Science and Technology is also playing a vital role in the standards work of the JISC. Since it is one of the responsibilities of the Agency to provide technical services to the bureaus and other agencies of the Ministry which perform a large part of the function of extending research into practice, the Agency has a complete picture of the developments in the many departments of the Ministry. Therefore, through its association with the Agency, the JISC is kept up to date with the entire industrial and technical research program of the Agency. This program is carried out by 14 institutions within the Agency. They are: the Central Institute of Weights and Measures; the Ceramics Research Institute; the Electrotechnical Laboratory; the Fermentation Research Institute; the Fuel Research Institute; the Geological Survey; the Hokkaido Coal Mining Laboratory; the Hokkaido Industrial Research Institute; the Industrial Arts Institute; the Kyushu Coal Mining Laboratory; the Mechanical Laboratory; the Osaka Chemical Industrial Research Institute; the Textile Research Institute; and the Tokyo-Chemical Industrial Research Institute.

Industry's Needs Looked After

A check on the Agency to see that its research program is designed to fit the needs of industry is carried out by the bureaus of the Ministry through their representation in the Industrial Technique Management Council. This Council, which operates directly under the Minister of Commerce and Industry, determines the general policies, budgets, and programs of the Agency. The Vice Minister is chairman of the Council, and the Director of the Agency is vice-chairman.

Little detailed information about the standards approved by the JISC has been received by the ASA. However, the ASA has been sent lists of articles published in the JSA's periodicals, the *Kikaku to Hyojun*, which give a clear indication of the subjects treated in the standardization work being done in Japan. Some of the topics listed are: Inspection standards of tablewares for export; surface roughness; standards of malleable cast iron; optical and surveying instruments; a discussion of cement standards; fireproof materials standards; plate glass standards; standards and inspection of miscellaneous goods for export; the standardization of zinc alloys; recent wiring apparatus and Japanese electrical standards; and the present condition of lignite coke manufacture. In addition, an article is listed on the unification of screw threads by Great Britain, Canada, and the United States.

The JISC has also sent the ASA lists of its standards, with titles translated into English. The length of the list is a good indication of the active work done by the Committee. Some of the standards which have been set up are: Electric Irons, JES Elec 9203; Portable Accumulators, JES Elec 8701; Accumulators for Fish-Gathering Lamps, JES Elec 8705; Testing Method of Vacuum Tubes for Receiving Set, JES Elec 7003; Dimensions of Seamless Steel Pipe for Water Work, JES Metal 0508; Dimensions of Thin Gas Pipe, JES Metal 0507; Electric Lamps for Automobiles, JES Elec 7506, JES Auto 8708; and Air Depolarizer Dry Cell, JES Elec 8502.

Standards from Other Countries

MEMBERS of the American Standards Association may borrow from the ASA Library copies of any of the following standards recently received from other countries. Orders may also be sent to the country of origin through the ASA office. The titles of the standards are given here in English, but the documents themselves are in the language of the country from which they were received.

For the convenience of our readers, the standards are listed under their general UDC classifications.

003 Writing

Chile

Mathematical Symbols, INDITECNOR 2.2-3
Symbols of Financial Mathematics, INDITECNOR 2.2-6
Symbols of Vector Analysis, INDITECNOR 2.2-7
Fundamental Astronomical Symbols, INDITECNOR 2.2-2

Germany

Standard Handwriting in Latin Script, DIN 1455

389 Metrology. Weights and Measures. Standardization

Chile

Preferred Numbers, INDITECNOR 2.4-2

Finland

Millimeter-Inch Conversion Tables, A.I. 2
Inch-Millimeter Conversion Tables, A.I. 3
Wire and Sheet Gages, Millimeter Equivalents of, A.I. 4 and A.I. 5

India

Rules for Rounding off Numerical Values, IS:2
Inch-Millimeter Conversion for Industrial Use, IS:3

621.3 Electrical Engineering

Germany

Indicating Lamp, DIN 49836
Miniature (Flashlight) Lamp, DIN 49846-48
Rubber Packing Ring, DIN 49984
Handwheels for Switchboard Apparatus, DIN 46056
Cable Lug and Binding Post, DIN 46227
Wire of Rectangular Section, DIN 46433
Wooden Poles for Overhead Lines, DIN 48350
Rules for Excess-Voltage Cut-Outs, DIN 57145
Rules for Protection Against Gas Explosion, etc, DIN 57173
Note on Destructive Action of Larva of Beetle on Wooden Poles, DIN 57215
Rules for Electric Machines Operating at Voltage up to 250 V, DIN 57740
Rules for Radio Capacitors, DIN 57870

Hungary

Standard AC Voltages, MOSz 1/MEE
Primary and Secondary No-Load Voltages of Transformers, MOSz 2/MEE
Standard Voltages of Three Phase AC Generators, MOSz 3/MEE
Standard Voltages of DC Generators, MOSz 4/MEE

Union of Soviet Socialist Republics

Rubber-Insulated and Armored Cables, GOST 1843-46

United Kingdom

Intrinsically-Safe Transformers for Bell-Signalling Circuits, BS 1452-1949

621.5 Pneumatic Machines. Refrigeration Technology

Germany

Flanges for Ammonia Line Pipes, DIN 3156
Flanges for Brine Conduits, DIN 3154

United Kingdom

Glossary of Terms Used in Automatic Controlling and Regulating Systems, Section 2: Process Control, BS 1523-1949

621.8 Machine Parts. Hoisting and Conveying Machinery. Power Transmission. Means of Attachment. Lubricatfon

Switzerland

Square Head Screws, Whitworth Thread, $\frac{1}{4}$ in. to $\frac{3}{8}$ in., VSM 12350
Square Head Screws, Metric Thread M5 to M10, VSM 12351
Flat Fillister-Head Screw With Shoulder, Metric Thread M2 to M10, VSM 12391
Round-Head Screw With Shoulder, Metric Thread M2 to M10, VSM 12393
Oval Fillister-Head Screw With Shoulder, Metric Thread M2 to M10, VSM 12395
Hexagon-Head Screw With Shoulder, Metric Thread M3 to M10, VSM 12397
Revision—Round-Head Rivets, Plain, 1-10 mm in Diameter, VSM 13102a
Revision—60° Countersunk Rivets, Plain, 1-10 mm in Diameter, VSM 13125a
Revision—90° Countersunk Rivets, Plain, 1-10 mm in Diameter, VSM 13126a
Revision—Truss-Head Rivets, Plain, 2-10 mm in Diameter VSM 13127a
120° Countersunk Rivets, Plain 2-10 mm in Diameter, VSM 13128
Revision—Pan-Head Rivets, Plain, 2-10 mm in Diameter, VSM 13130a
Rivets' Driven Heads, Round and Truss Heads, Dimensions, VSM 13140
Rivets' Driven Heads, Pan and Flat Heads, Dimensions, VSM 31341
Rivets' Driven Heads, 60° and 90° Countersunk Heads, Dimensions, VSM 13142
Screwdrivers for Slotted Cylindrical Nuts, VSM 35604
Types of Lubricating Fittings, VSM 19335/6

Union of South Africa

Re-refined, Regenerated or Reclaimed Internal Combustion Engine Crankcase Oil, SABS 9-1948

Union of Soviet Socialist Republics

Graphite Lubricants, GOST 3333-46
Grease No. 12 (VP), GOST 3334-46
Apron Conveyors, GOST 2035-43
Scrapping Underground Conveyors, GOST 3298-46
Pins, Cylindrical, GOST 3128-46

621.9 Machine Tools. Tools. Operations, in Particular for Metal and Wood

Germany

Various Forms of Cold Chisels, DIN 6452, 6454-56
Scrapers, DIN 8350
Various Forms and Types of Grinding and Polishing Wheels and Tools, DIN 69100, 69102/3, 69106, 69120, 69123, 69125, 69129, 69138/9, 69141, 69149-51, 69158-60, 69162, 69164, 69170-73, 69186-88
Hole Cutting Shears, DIN 6438

Switzerland

Attachment of Inserted Blades Milling Cutters on the Spindle With High Taper, Dimensions, VSM 33932
Arbors With Taper Shank for Adjustable Blade Shell Reamers, VSM 34303
Shell Reamers, VSM 34330

629.12 Ships and Shipbuilding

France

Latch, Large Model, NF J31-411
Various Kinds of Ship Lever-Latches, Ordinary or Waterproof, With or Without Handles or Keys, Construction Details, NF J31-430-435, NF J31-440, NF J31-449-451
Wooden Sanitary Partition, NF J35-132/3
Oval Shaped Hinges, NF J36-220

The Netherlands

Shipbuilding Details, Auxiliary Engines for Windlass, N 922
Shipbuilding Details, Auxiliary Engines, Electric Cranes, N 944
Shipbuilding Details, Auxiliary Engines, Steam Winches, N 1573
Shipbuilding Details, Auxiliary Engines, Heads for Winches and Windlasses, N 1575
Shipbuilding Details, Auxiliary Engines, Drum Dimensions With Hook for Wire Ropes, N 1576
Shipbuilding Details, Auxiliary Engines, Rules for Electric Winches, N 1590

Union of Soviet Socialist Republics

Ship Equipment, Hose Coupling, GOST 3124-46
Ship Manhole and Light Openings, GOST 3148-46
Towboats for Rivers and Lakes, GOST 3445-46
Steel Barges, River Type, for Dry Cargo, GOST 3446-46
Steel Tanker Barges, River Type, GOST 3447-46

United Kingdom

Dimensions of Ships' Stud Link Anchor Cables, BS 3006-1949

(*Continued on following page*)

(Continued from page 191)

64 Domestic Science

France

Cooking, Heating, Lighting and Refrigerating Appliances, Terminology, NF D31-001

United Kingdom

Kitchen Fitments and Equipments, BS 1195-1948

668 Various Organic Chemical Industries

United Kingdom

Cresylic Acid of Specified Orthocresol Content, BS 517-1948
Cresylic Acid of Specified Metacresol Content, BS 521-1948
Orthocresol, Metacresol and Paracresol, BS 522-1948
Phenol, BS 523-1948
Refined Cresylic Acid, BS 524-1948

691 Building Materials

Belgium

Solid Terra Cotta Bricks for Ordinary Masonry Work, NBN 118

Union of Soviet Socialist Republics

Mineral Fillers for Concrete, GOST 2778-44
Brick Clinker Filler for Concrete, GOST 3192-46
Granulated Blast-Furnace Slag, GOST 3476-46

United Kingdom

Waterproof Building Papers, BS 1521-1949

List of AMERICAN STANDARDS Is Now Available

MORE than 140 new American Standards, approved since January of this year, are included in the midyear list of standards and special publications just issued by the American Standards Association. The list shows a total of 1124 standard specifications, methods of test, building requirements, dimensions, safety codes, definitions and terminology in all fields of engineering as well as for materials and equipment used by the ultimate consumer.

All of these have been given the status of "American Standard" through the procedure of the Association which assures all groups concerned an opportunity to have a voice in their development.

Important new standards listed for the first time include a series on chemicals used in photographic processing, soap specifications, lamp dimensions and electrical characteristics, textiles, electrical indicating instruments, and building code requirements on signs and outdoor display structures. There are also two new American Standards in the series on small tools and machine tool elements and a recently completed American Standard Plumbing Code.

Special publications offered include "What Good Are Standards," a handbook of practical answers assembled from the proceedings of the Thirtieth Annual Meeting of the Association, and "Democracy in Action," the story of the development of the Association. It also includes a report on "Nationally Recognized Standards in State Laws and Local Ordinances," issued in an attempt to find an answer to the problem of how nationally recognized standards can legally be put into effect and kept up to date.

The new list offers a complete set of all American Standards at $250 and a complete set of all American Safety Standards at $37.50.

The 28-page List of American Standards (July 1949) can be obtained from the American Standards Association, 70 East 45th Street, New York 17, N. Y., without charge.

Coordinating Committee Organized For Plumbing

A COORDINATING Committee on Plumbing, set up to develop a coordinated national plumbing code, held its first meeting in Washington May 9 and 10. Organization of the committee was carried out under the auspices of the American Society of Mechanical Engineers and the American Public Health Association, joint sponsors for the ASA project on Minimum Requirements for Plumbing and Standardization of Plumbing Equipment.

"The need for a nationwide code has been recognized for a long time," the ASME declared in announcing plans for the committee. "At present there are over 1600 plumbing codes in the land, resulting in a situation where plumbing requirements for safety and health vary chaotically between, and even within, different sections of the country. Uniformity of requirements would be of great benefit to the general public, building owners, tenants, and the manufacturers of plumbing supplies as well as to the plumber who installs the equipment."

The Coordinating Committee has decided to base its work on the American Standard Plumbing Code, A40.7-1949, approved in February 1949; the Uniform Plumbing Code for Housing, issued by the Housing and Home Finance Agency in February 1948; and the Recommended Minimum Requirements for Plumbing, BH 13, issued about 1930 by the Department of Commerce on behalf of the subcommittee on plumbing of the former Department of Commerce Building Code Committee. The committee plans to hold semi-annual meetings of two or more days in length, and it is hoped that its work can be accomplished in about two years.

The organizations that are members of the Coordinating Committee are: the American Society of Mechanical Engineers, the American Public Health Association, the Building Officials Conference of America, the Conference of State Sanitary Engineers, the Western Plumbing Officials Association, the American Society of Sanitary Engineering, and the U.S. Department of Commerce.

Professor F. M. Dawson of the University of Iowa is chairman of this committee, and V. T. Manas of the Department of Commerce Construction Division is executive secretary.

ASA STANDARDS ACTIVITIES

Status as of June 3, 1949

American Standards Approved Since May 6, 1949

Specifications for Copper Pipe, Standard Sizes (ASTM B 42-47; ASA H26.1-1949)

Specifications for Red Brass Pipe, Standard Sizes (ASTM B 43-47; ASA H27.1-1949)

Specifications for Bronze Castings in the Rough for Locomotive Wearing Parts, ASTM B 66-46; ASA H28.1-1949

Specifications for Car and Tender Journal Bearings, Lined, ASTM B 67-46; ASA H29.1-1949

Specifications for Copper-Silicon Alloy Wire for General Purposes, ASTM B 99-47; ASA H30.1-1949

Specifications for Rolled Copper-Alloy Bearings and Expansion Plates and Sheets for Bridge and Other Structural Uses, ASTM B 100-47; ASA H31.1-1949

Specifications for Brass Wire, ASTM B 134-48; ASA H32.1-1949

Specifications for Leaded Red Brass (Hardware Bronze) Rods, Bars, and Shapes, ASTM B 140-47; ASA H33.1-1949

Specifications for Malleable Iron Castings, ASTM A 47-48; ASA G48.1-1949

Zinc-Coated (Galvanized) Iron or Steel Sheets, ASTM A 93-48T; ASA G8.2-1949

Sponsor: American Society for Testing Materials

Buzz-Track Test Film for 35-Mm Motion Picture Sound Reproducers, Z22.68-1949

Sponsor: Society of Motion Picture Engineers

Graphical Heating, Ventilating, and Air-Conditioning Symbols for Use on Drawings, Z32.2.4-1949

Graphical Welding Symbols and Instructions for Their Use, Z32.2.1-1949

Graphical Pipe Fittings, Valves, and Piping Symbols for Use on Drawings, Z32.2.3-1949

Graphical Plumbing Symbols for Use on Drawings, Z32.2.2-1949

Sponsors: American Society of Mechanical Engineers; American Institute of Electrical Engineers

Letter Symbols for Structural Analysis, Z10.8-1949

Sponsor: American Society of Mechanical Engineers; American Association for the Advancement of Science; American Institute of Electrical Engineers; American Society of Civil Engineers; American Society for Engineering Education

American Standards Being Considered for Approval

By the Standards Council—

Method of Test for Accelerated Aging of Vulcanized Rubber by the Oxygen-Pressure Method (Revision of ASTM D572-42; ASA J4.1-1943)

Method of Test for Accelerated Aging of Vulcanized Rubber by the Oven Method (Revision of ASTM D573-45; ASA J5.1-1945)

Sponsor: American Society for Testing Materials

Test for Cone Penetration of Lubricating Grease, ASTM D217-48; ASA Z11.3

Test for Sulfated Residue, Lead, Iron and Copper in New and Used Suburating Oils, ASTM D810-48; ASA Z11.57

Chemical Analysis for Metals in Lubricating Oils, ASTM D811-48; ASA Z11.56

Test for Sediment in Fuel Oil by Extraction, ASTM D473-48; ASA Z11.58

Definition of Terms Relating to Petroleum (Revision of ASTM D288-47; ASA Z11.28-1948)

Test for Knock Characteristics of Motor Fuels by the Motor Method (Revision of ASTM D357-47; ASA Z11.37-1948)

Sponsor: American Society for Testing Materials

Horticultural Standards, Z60

Sponsor: American Association of Nurserymen

Letter Symbols for Electrical Quantities, Z10.5

Sponsors: American Association for the Advancement of Science; American Institute of Electrical Engineers; American Society of Civil Engineers; American Society for Engineering Education; American Society of Mechanical Engineers

By the Board of Review—

Specifications for White Floating Soap (Revision of ASTM D499-39; ASA K60.4-1949)

Specifications for Milled Toilet Soap (Revision of ASTM D455-39; ASA K60.6-1949)

Specifications for Compound Chip Soap (With Rosin) (Revision of ASTM D690-44; ASA K60.8-1949)

Sponsor: American Society for Testing Materials

By the Board of Examination—

Audiometers for General Diagnostic Purposes, Z24.5

Sponsor: Acoustical Society of America

By the Mechanical Standards Committee—

Reamers, B5.14 (Revision of B5.14-1941)

Sponsors: Metal Cutting Tool Institute; Society of Automotive Engineers; American Society of Mechanical Engineers; National Machine Tool Builders' Association

American Standards Being Considered for Reaffirmation

By the Mechanical Standards Committee—

Jig Bushings, B5.6-1941

Rotating Air Cylinders, B5.5-1932

Machine Tapers, Self Holding and Steep Taper Series, B5.10-1943

Spindle Noses and Arbors for Milling Machines, B5.18-1943

Sponsor: American Society of Mechanical Engineers

Withdrawal of American Standard Being Considered

Miscellaneous Outside Coal Handling Equipment, M10-1928

Test for Tetraethyl Lead in Gasoline, ASTM D526-42; ASA Z11.48-1942

New Projects Requested

Deep Well Vertical Pumps, B58

Requested by: American Water Works Association

Fluid Permeation, Z59

Requested by: American Geophysical Union; Geophysical Society of America

Withdrawal of Projects Requested

Stock Sizes, Shapes and Lengths for Iron and Steel Bars, Including Flats, Squares, Rounds and Other Shapes, B41

Unification of Rules for the Dimensioning of Furnaces for Burning Solid Fuel, B50

Drain Tile, A6

What's Happening On Projects

Small Tools and Machine Tool Elements, B5—

Sponsors: National Machine Tool Builders' Association; Society of Automotive Engineers; Metal Cutting Tool Institute; The American Society of Mechanical Engineers

The American Society of Mechanical Engineers, as administrative sponsor for Sectional Committee B5, announces the distribution for comment of the proposed American Standard Designation and Working Ranges of Surface Grinding Machines of the Reciprocating Table Type and Plain Cylindrical Grinding Machines.

The objective of Technical Committee No. 6 on Designations and Working Ranges of Machine Tools, which prepared the proposed standard, is to provide a means of identifying machine tools so that a user can specify reasonably similar size and capacity by means of a simple designation. Each unit so specified is to be standardized as to working range: that is, as to its ability to receive a workpiece of specified dimensions and to perform operations of the same magnitude upon it. The committee does not contemplate standards that will otherwise limit the distinctive design features of machine tools nor their degree of precision.

In preparing this proposed standard the technical committee took into consideration the activities of other special committees operating as part of Sectional Committee B5, in order to avoid conflict.

In carrying out its assignment, the committee is working with the National Machine Tool Builders' Association and is making use of the work done by the NMTBA technical groups.

Copies of the Proposed American Standard can be obtained by addressing S. A. Tucker, Standards Manager, The American Society of Mechanical Engineers, 29 West 39 Street, New York 18, N.Y. Comments and suggestions will be welcomed by the committee.

(*Continued from page* 194)

Steel Raceways for Electric Wiring Systems, C80—

Sponsors: American Iron and Steel Institute; National Electrical Manufacturers Association

The revised and approved scope of this committee includes the development of standards for rigid steel conduit and electrical metallic tubing raceway systems, as well as components such as elbows, couplings, connectors, bushings, and locknuts. It also includes standards for threads for rigid conduit and threaded components.

J. C. Siegle of Youngstown Sheet and Tube Company, representing the American Iron and Steel Institute, is chairman of this sectional committee, and W. O. Zervas, American Iron and Steel Institute, is secretary.

Electric Lamp Bases and Holders, C81

Sponsor: Electrical Standards Committee

Work outlined by ASA Sectional Committee C81 at its first meeting June 3 will be carried out to establish standards for the base assemblies on electric lamps and corresponding electric lamp holders and to establish mechanical dimensions standards for starters for electric discharge lamps and corresponding holders in order to insure interchangeability.

Sectional Committee C81 has proposed that Sectional Committee C78 on Standards for Electric Lamps consider the formation of a subcommittee to handle the electrical characteristics of starters for electric discharge lamps.

H. H. Watson of the General Electric Company, Bridgeport, Conn is chairman of this sectional committee. The next meeting is scheduled for the early fall of this year.

Protective Occupational Clothing, L18—

Sponsor: Industrial Safety Equipment Association

Work on the standardization of protective occupational clothing has been taken over by the ASA Sectional Committee L18 from the ASA War Committee. This sectional committee intends to review the American War Standards and to determine whether they should be abolished, revised, or whether new standards should be adopted. In developing new standards the sectional committee plans to provide clothing for the adequate protection of employees engaged in industrial operations presenting specific occupational hazards. The standards may include performance requirements, specifications of materials, detailed construction requirements, methods of test, minimum sizes or dimensions, recommendations for proper nomenclature, and methods of designating such clothing.

Some of the types of clothing that may be considered are aprons, leggings, coats, overalls, sleeves, and gloves. Excluded will be linemen's rubber protective equipment, equipment for the protection of heads, eyes, and respiratory organs, and footwear.

Edison L. Wheeler, Wheeler Protective Apparel, Inc, representing the Industrial Safety Equipment Association has been appointed chairman of this sectional committee, and Raymond J. Water, Industrial Safety Equipment Association, has been named secretary.

On May 17 at the first meeting of the ASA Sectional Committee L18 Mr Wheeler was authorized to set up five subcommittees. Subcommittee 1 will handle specifications and methods of test for materials (asbestos, cotton, leather, and wool). Subcommittee 2 will consider leggings and spats. Subcommittee 3 will cover hand and arm protection. Subcommittee 4 will consider all other body protection, and Subcommittee 5 will work on chemical protection.

Mr Wheeler has appointed the chairman of these subcommittees. Robert Clair, Liberty Mutual Insurance Co, representing the National Association of Mutual Casualty Companies, will head Subcommittee 1; Myron L. Miller, Westinghouse Electric Corp, representing the National Electrical Manufacturers Association will head Subcommittee 2; Stewart J. Owen, Jr, National Bureau of Standards, will head Subcommittee 3; Carter Kendall, Bethlehem Steel Co, representing the American Society of Safety Engineers, will be in charge of Subcommittee 4; and W. F. Weber, Western Electric Co, representing the Telephone Group, will head Subcommittee 5.

The subcommittee handling materials will include technical experts on all of the materials listed and will also act as an advisory committee to Subcommittees 2, 3, and 4.

Electrical Equipment in Coal Mines, M2

Sponsor: U. S. Bureau of Mines and the American Mining Congress

Changes on the draft for a revision of the American Standard safety rules for installing and using electrical equipment in coal mines, circulated late in April, were made by the sectional committee in a meeting on May 26 at the U. S. Bureau of Mines in Pittsburgh.

Another draft is to be prepared for letter ballot by this sectional committee, of which A. Lee Barrett (American Mining Congress and American Institute of Mining and Metallurgical Engineers) is chairman.

Home Kitchen Utensils, Z61—

Another step was taken May 25 toward completion of an American Standard for the dimensions and tolerances of cooking utensils and measuring cups and spoons, and for definitions of terms used. This step was approval of a draft standard by a general conference at which representatives of kitchenware manufacturing groups, food and recipe producing groups, and the home economics association were present. The draft will now go to other organizations who have indicated their interest in the problem but were unable to have representatives at the conference. When a letter ballot of these groups has been completed, the proposed standard will be presented to the American Standards Association for final approval and publication.

Work on the standard was undertaken at the request of the American Home Economics Association after a survey showed that the large variety of sizes of cooking utensils and measuring cups and spoons have made it difficult in some cases to get uniform results. The project is organized under the general conference method.

Mrs Elizabeth Sweeney Herbert, representing the American Home Economics Association, was elected chairman of the conference meeting May 25.

Pan American Engineering Congress To Meet in Rio de Janeiro

Engineering societies and technical associations from all parts of the hemisphere will meet this summer in Rio de Janeiro, Brazil at the First Pan American Engineering Congress, July 15 to 24. The principal meeting will be in Rio de Janeiro and at the world-famous hotel of Quitandinha about 70 miles outside the city. Preceding this meeting, the Union Sudamericana de Associacion de Ingenieros will have a week's meeting in São Paulo.

Although engineers from all the Latin American countries have met before, this is the first Congress to which engineers from the United States and Canada have been invited as active participants. The intention is to create a pattern for succeeding meetings of a truly Pan American character.

The organization of the First Pan American Engineering Congress is being directed by F. Saturnino de Brito, filho. Under his presidency, a large number of papers and technical studies will be presented covering all branches of engineering and technology. More than 100 papers from the United States have been submitted to the Congress, ranging from all aspects of civil engineering, through mechanical, electrical, mining, metallurgical, management, and chemical engineering. The session on standardization will hear two papers from the United States. One of these is by Howard Coonley, chairman of the Executive Committee of the American Standards Association and president of the International Organization for Standardization. His subject is "International Standardization—Its Significance in International Relations." The other is by Dr John Gaillard, mechanical engineer on the ASA staff, on "The Formulation of Industrial Standards." The American Standards Association has asked M. E. Souza, General Electric S.A., to serve as its representative at the Congress.

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New American Standards Available

ASA Number	Title of Standard	Price
B16.14-1949	Ferrous Plugs, Bushings, and Locknuts, with Pipe Threads	$ .40
B16.17-1949	Brass or Bronze Screwed Fittings, 250 LB	.35

Two more in a series of American Standards for Pipe, Piping Code, Pipe Flanges, and Fittings are now available. (*Sponsors:* Heating, Piping, and Air Conditioning Contractors National Association; Manufacturers Standardization Society of the Valve and Fittings Industry; American Society of Mechanical Engineers)

C59.16-1949	Laminated Thermosetting Products	.35
C59.17-1949	Fabricating Laminated Plastics, Practice for	.25

Specifications are given in the first standard on laminated thermosetting products, for sizes and variations; physical and electrical properties; and test methods for these properties. In the second standard, recommended practice for fabricating laminated plastics from sheet, rod, or tube form is covered. (*Sponsor:* National Electrical Manufacturers Association)

G37.1-1949	Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service, Specifications for (ASTM A182-48T)	.25

Twelve grades of steel (six ferritic and six austenitic) are covered. manufacturing practice, chemical requirements, and test methods are given. (*Sponsor:* American Society for Testing Materials)

G38.1-1949	Carbon-and Alloy-Steel Nuts for Bolts for High-Pressure and High-Temperature Service, Specifications for (ASTM A194-48)	.25

These specifications cover five classes of material for bolts used in high-pressure or high-temperature service. (*Sponsor:* American Society for Testing Materials)

K60.1-1949	Chip Soap, Specifications for (ASTM D496-39)	.25
K60.2-1949	Ordinary Bar Soap, Specifications for (ASTM D497-39)	.25
K60.3-1949	Powdered Soap, Specifications for (ASTM D498-39)	.25
K60.5-1949	Alkaline Soap Powder, Specifications for (ASTM D534-42)	.25
K60.7-1949	Built Soap, Powdered, Specifications for (ASTM D533-44)	.25
K60.9-1949	Compound Powdered Soap, (Granulated, with Rosin), Specifications for (ASTM D691-44)	.25
K60.10-1949	Caustic Soda, Specifications for (ASTM D456-39)	.25
K60.11-1949	Soda Ash, Specifications for (ASTM D458-39)	.25
K60.12-1949	Trisodium Phosphate, Specifications for (ASTM D538-44)	.25
K60.13-1949	Salt-Water Soap, Specifications for (ASTM D593-42)	.25
K60.14-1949	Liquid Toilet Soap, Specifications for (ASTM D799-45)	.25
K60.15-1949	Olive Oil Chip Soap, Specifications for (ASTM D630-42)	.25
K60.16-1949	Palm Oil Chip Soap, Specifications for (ASTM D536-42)	.25
K60.17-1949	Modified Soda (Sequicarbonate Type), Specifications for (ASTM D457-39)	$ .25
K60.18-1949	Sodium Metasilicate (ASTM D537-41)	.25
K60.19-1949	Sodium Sesquisilicate (ASTM D594-41)	.25
K60.20-1949	Tetrasodium Pyrophosphate (Anhydrous) (ASTM D595-45)	.25
K60.21-1949	Sampling and Chemical Analysis of Alkaline Detergents (ASTM D501-46)	.25

General requirements, chemical composition, and basis of purchase for soaps and synthetic detergents are covered in these specifications. (*Sponsor:* American Society for Testing Materials)

Specifications for Photographic Grade Chemicals:

Acids

Z38.8.100-1949	Acetic Acid, Glacial	.25
Z38.8.101-1949	Sulfuric Acid	.25
Z38.8.102-1949	Citric Acid	.25
Z38.8.103-1949	Boric Acid, Crystalline	.25
Z38.8.104-1949	Hydrochloric Acid	.25
Z38.8.106-1949	Acetic Acid, 28 Percent	.25

Developing Agents

Z38.8.126-1949	Hydroquinone (Para-Dihydroxybenzene, Quinol, Hydrochinone, Hydroquinol)	.25
Z38.8.128-1949	Para-Hydroxyphenylglycin (Athenon, Glycin, Iconyl, Monazol)	.25

Hardeners

Z38.8.150-1949	Aluminum Potassium Sulfate, Crystalline	.25
Z38.8.151-1949	Chromium Potassium Sulfate, Crystalline	.25
Z38.8.152-1949	Formaldehyde Solution	.25
Z38.8.153-1949	Paraformaldehyde	.25

Miscellaneous

Z38.8.175-1949	Sodium Sulfate, Anhydrous	.25
Z38.8.176-1949	Sodium Acetate, Anhydrous	.25
Z38.8.177-1949	Potassium Dichromate	.25
Z38.8.178-1949	Potassium Permanganate	.25
Z38.8.179-1949	Potassium Ferricyanide	.25
Z38.8.180-1949	Copper Sulfate	.25
Z38.8.181-1949	Potassium Persulfate	.25
Z38.8.182-1949	Sodium Sulfide, Fused	.25

Restrainers and Antifoggants

Z38.8.200-1949	Potassium Bromide	.25

Fixing Agents

Z38.8.250-1949	Sodium Thiosulfate, Anhydrous	.25
Z38.8.251-1949	Sodium Thiosulfate, Crystalline	.25

Sulfites

Z38.8.276-1949	Sodium Bisulfite	.25

This series of 24 standards is intended to establish criteria of purity of photographic grade chemicals. (*Sponsor:* Optical Society of America)